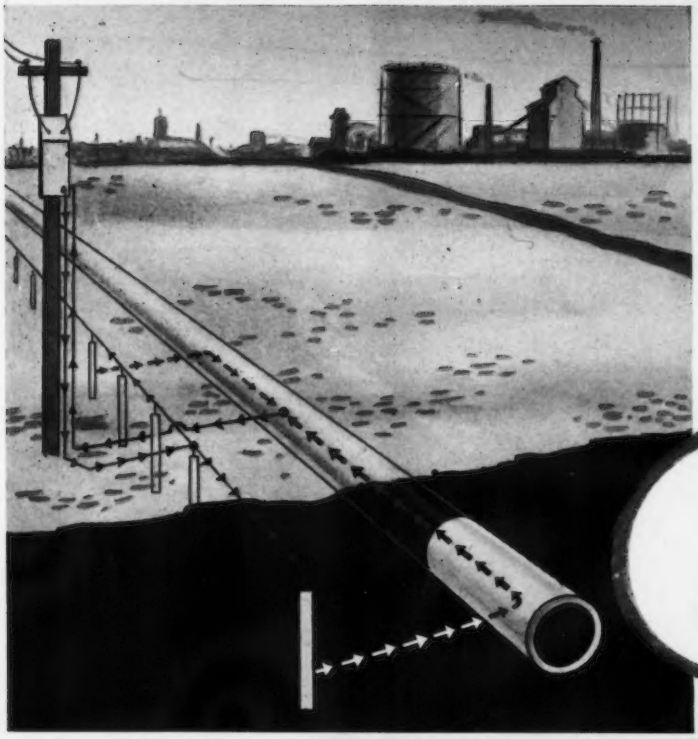
Gas Journal

VOL. 283. 107th YEAR. LONDON, AUGUST 24, 1955 No. 4812. PRICE 1/3

TECHNOLOGY DEPT.

STEEL TUBES & FITTINGS
STRONGEST AND CHEAPEST



Cut Corrosion Costs!

Properly engineered Cathodic Protection will prevent corrosion of any buried or submerged steel structures such as pipe-lines, tanks, gas-holders, jetties, ships' hulls, and also the internal surfaces of water cooled heat exchangers and kindred plant.

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CATHODIC CORROSION CONTROL LTD.

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- CORROSION RESISTING STEEL DOOR.
- SPECIAL RESILIENT NON-METALLIC COMPOSITION SEATS SELF-LUBRICATED.
- SIMPLE AND ROBUST IN CONSTRUCTION.
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SIZES 3" TO 24"
HORIZONTAL AND VERTICAL

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Rock, soil or shale—level or inclined—whatever the terrain, its all the same to NORWEST. Past experience in main-laying throughout the British Isles, combined with new techniques, has evolved a thoroughly practical approach to all the usual, and many unusual, problems. NORWEST resources are at your disposal—may we quote you for your next contract?

THE **MAIN** LAYING PEOPLE

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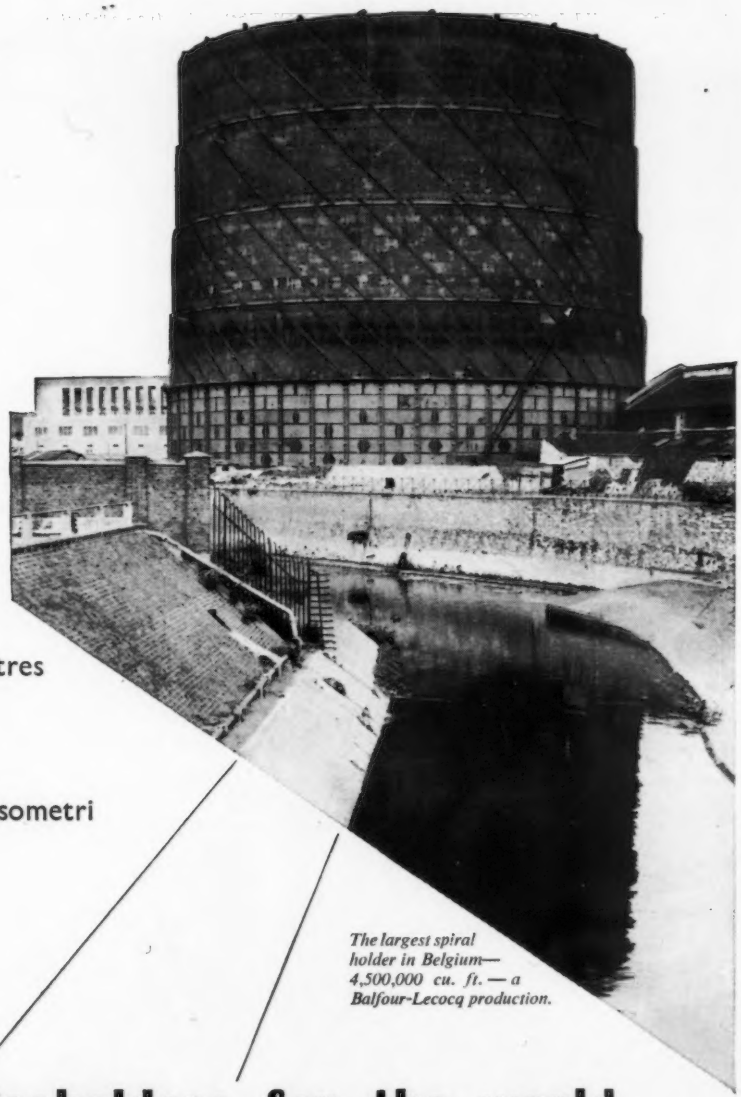
NORWEST CONSTRUCTION CO. LTD., LIVERPOOL, 21 · CIVIL ENGINEERING CONTRACTORS

CVS.14



- Balfour gradi gasometre za ceo svet.
- Balfour construit des gazometres pour le monde entier.
- La ditta Balfour costruisce gasometri per tutto il mondo.

. . . or in other words . . .

The largest spiral holder in Belgium— 4,500,000 cu. ft. — a Balfour-Lecocq production.

Balfours build gasholders for the world . . .

Recently completed gasholders in Brussels and Milan, and those under construction in Jugoslavia and Scotland, bear testimony to the name of Balfour. The reason isn't hard to find. For over one hundred and forty years the Balfour organisation have been to the Gas Industry a source for the planning, manufacture and installation of a complete range of equipment.

Gas production, purification, storage, the recovery of by-products, whatever the problem this wealth of past experience and present ability is at your service.

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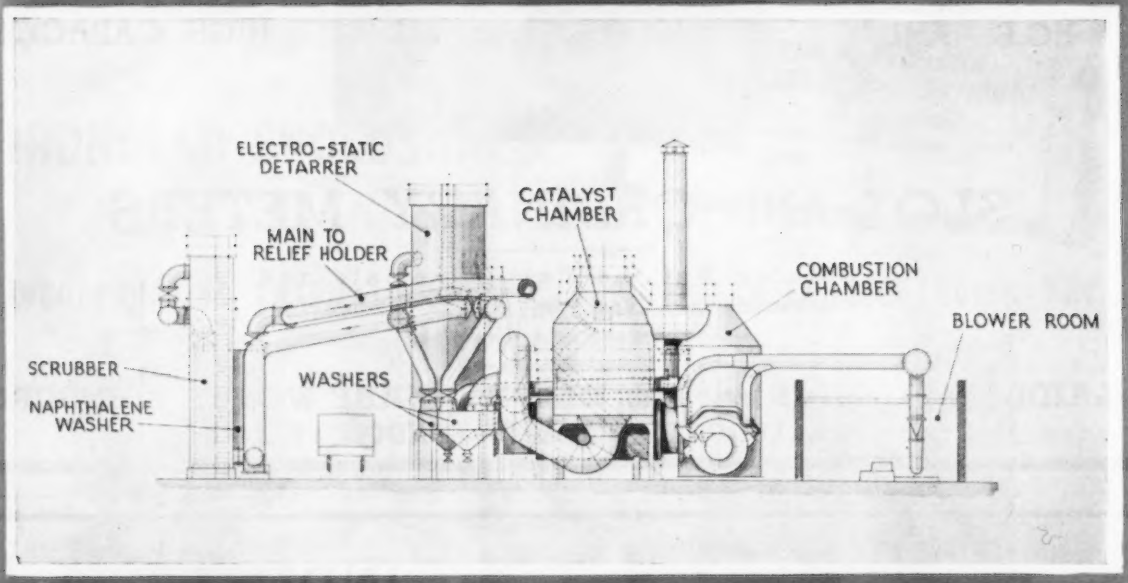
2,000,000 CU. FT. PER DAY
ONIA-GEGI CATALYTIC OIL GAS PLANT
for Hilsea Gasworks, Portsmouth



The above Plant which is under construction for the Southern Gas Board, is the initial section of a proposed 8,000,000 cu. ft. per day installation.

HG

28 Onia-Gegi Catalytic Oil Gas Installations are in operation and under construction having a total capacity of over

65,000,000 CU. FT. PER DAY

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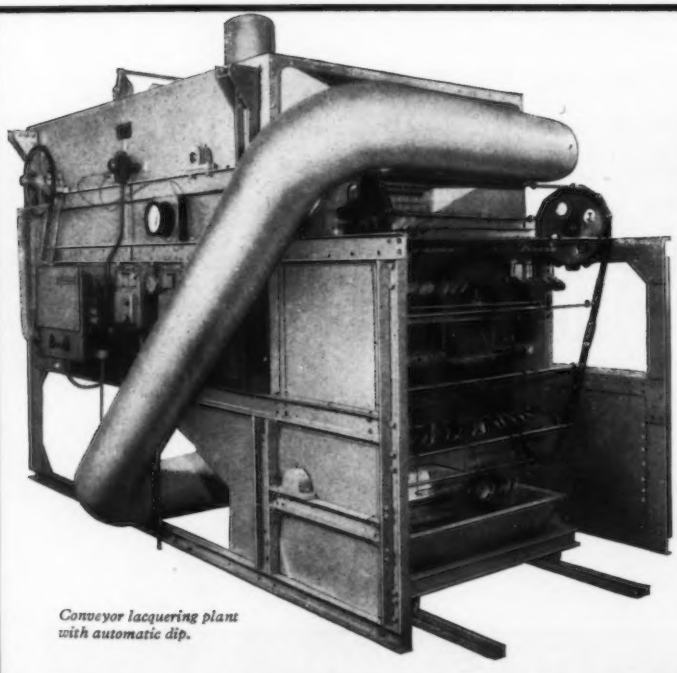

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CORE BALANCE EARTH LEAKAGE PROTECTION

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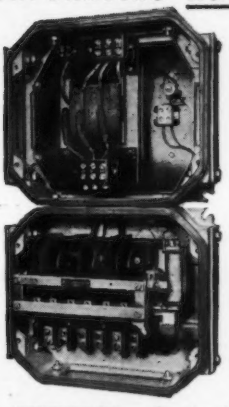
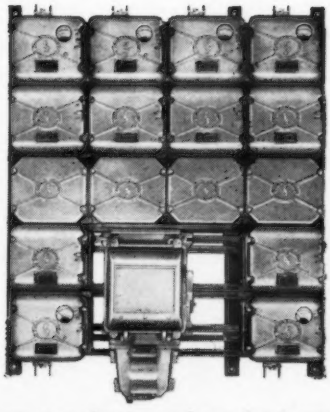
Refer to Page 22 "Electrical Accidents and their causes 1952" M o L 929

INCORPORATING AUTOMATIC CIRCUIT BREAKERS IN EACH OUTGOING WAY



A triple pole 30 amp. Circuit Breaker with core balance transformer and E.L. relay.

A typical multi-way 15 amp. board with instruments. Individual panel isolators also available.



UNIQUE for its Core Balance Leakage protection.
UNIQUE as an Ironclad distribution with automatic protection for normal overloads and short circuits.
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UNIQUE for factory circuit protection with Earth Leakage discrimination of 0.5 amps. and 0.75 amps.
UNIQUE for application to portable and transportable equipment, for industrial use, mines and quarries, cement works, and marshalling yard installations.

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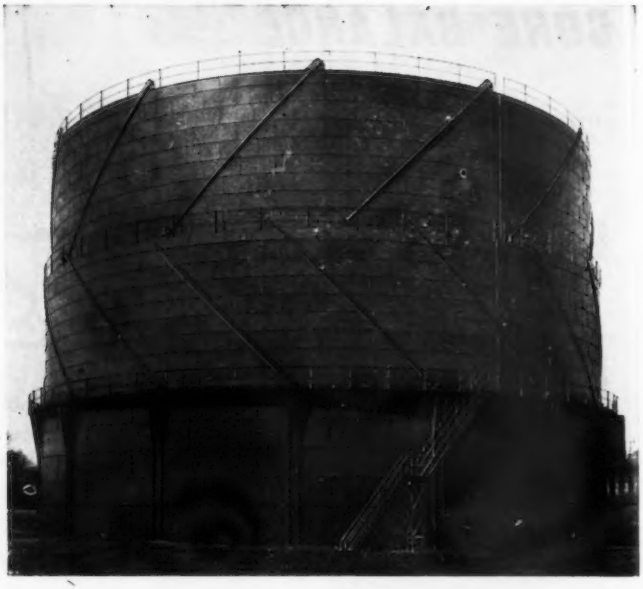

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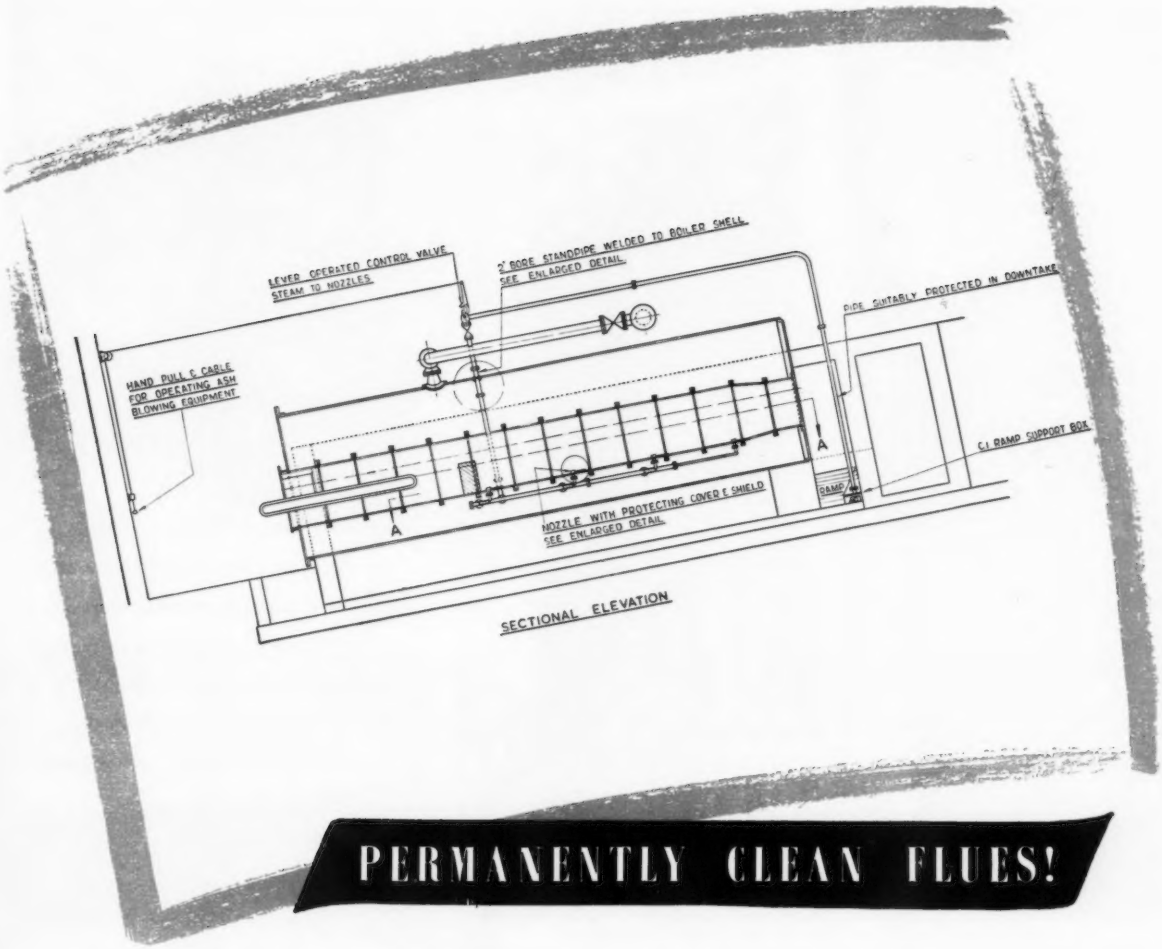
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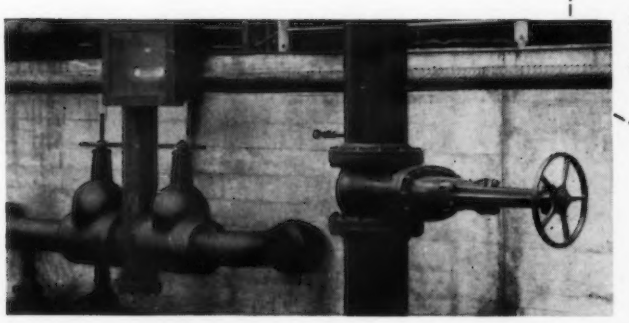
Installation of the 'Counterflo' Water Cooling Towers at Messrs. Philblack Limited Bristol by Head Wrightson Processes Ltd. London.

Once again, valves by Crane ...

These 'Counterflo' Water Cooling Towers—at the Avonmouth plant of Philblack Limited, manufacturers of Carbon Black from a petroleum fraction—are the most modern timber constructed induced draught cooling towers in Europe. Treated water comes into these towers from various process lines to have the surplus heat extracted before returning to the plant for further use. It is essential that this flow of water should be rigidly controlled. That Crane valves were chosen to do this vital job—and that they are widely used in other sections of the plant—is further proof of their fine reputation throughout the oil and allied industries.



Crane 12" No. F81 Cast Iron Gate Valves, with bronze trim, outside screw and yoke, control main risers—4" and 6" control the oil lines.

CRANE VALVES AND FITTINGS

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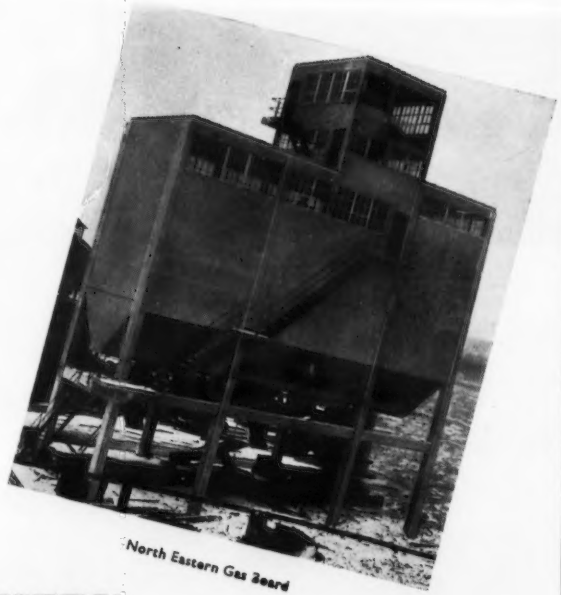

North Eastern Gas Board

Recent

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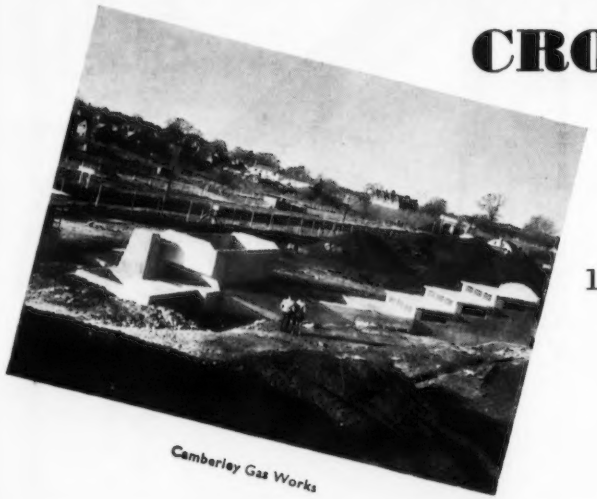

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There's 4 MILLION FEET OF PROOF that FRANCOIS BORED PILES GIVE GREATER STRENGTH & STABILITY to foundations of every type.

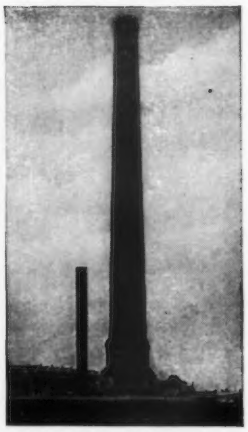
From the investigation of the site to the completion of the job, the Cementation Co. Ltd. provide a complete world-wide service on foundations and underpinning, which is unrivalled for experience, facilities and resources.

Time has proved, over and over again that concrete piles and cementation methods not only give the greatest strength and stability to many types of foundation, but are often the only solution in certain difficult conditions.

In addition there is no harmful vibration, distortion or excessive noise during construction.

The successful completion of over 4 million feet of Board Piling during the last fifteen years is an achievement which speaks for itself.

Left : Trial borings for reconstruction of Coventry Cathedral.



Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right)

Write for your copy of our new booklet about Bored Piling.

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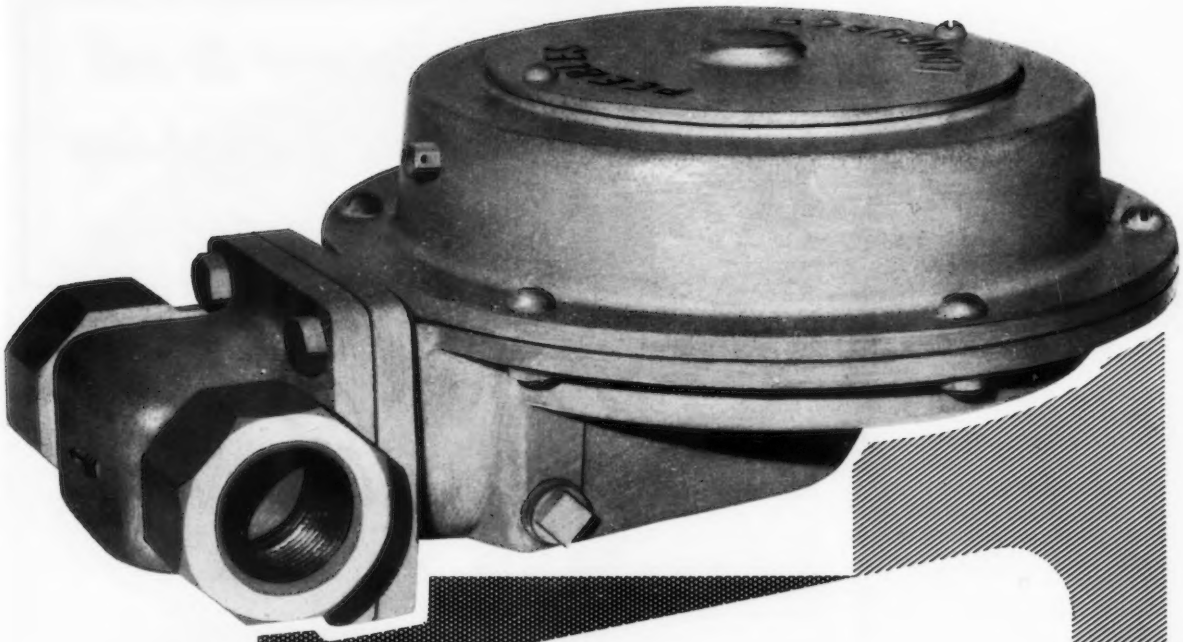

The Figure 103

HIGH PRESSURE GOVERNOR

This governor may be arranged for gas flow in any direction, either horizontal or vertical, and it is suitable for inlet pressures up to 150 lbs. per square inch, with the outlet pressure in accordance with customers' requirements. Weight loading or spring loading may be employed according to pressure conditions.

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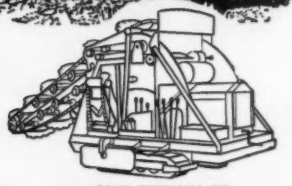

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The illustration shows an air-cooled Compressor for 15 p.s.i.g. Also available as a water-cooled machine for h.p. distribution.

H.106A

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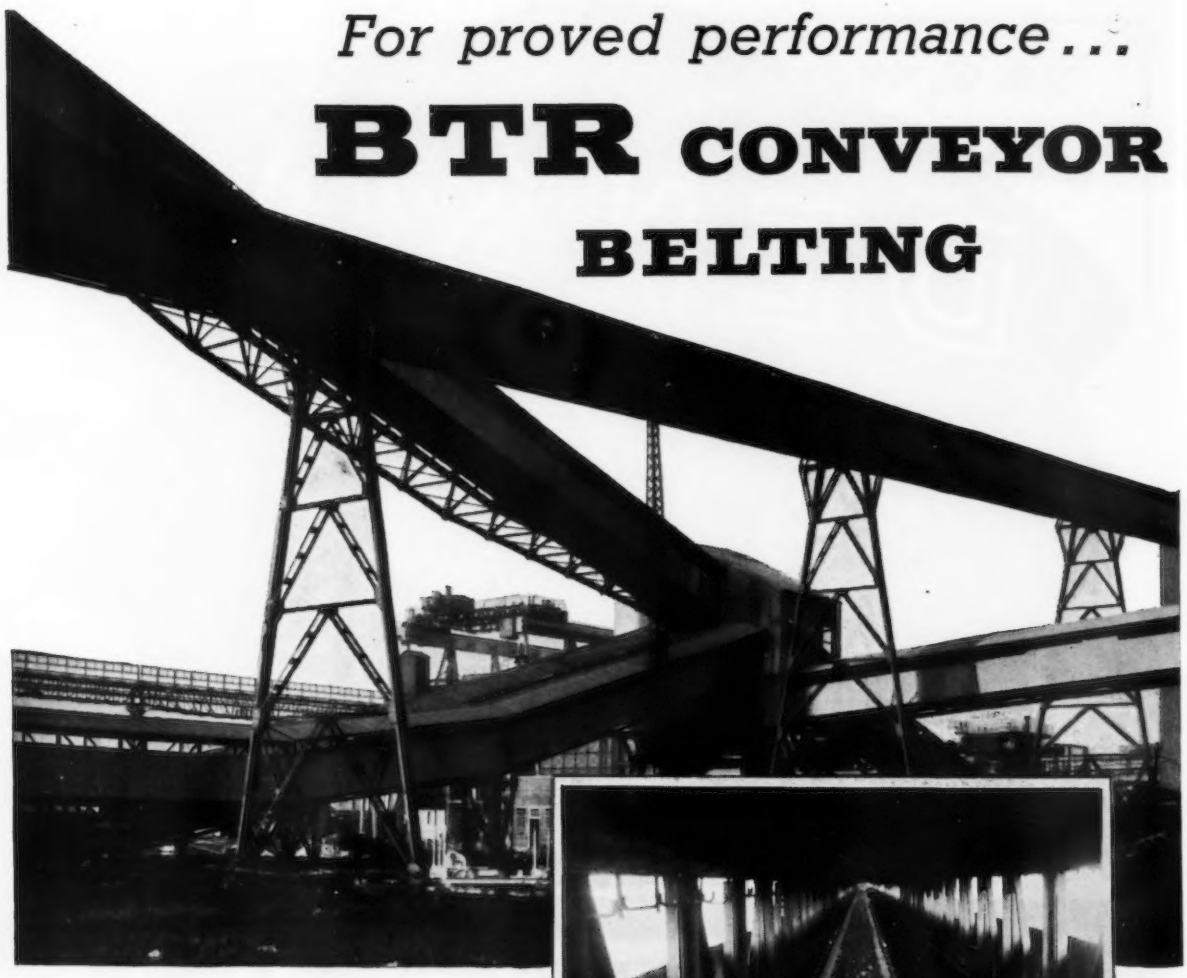

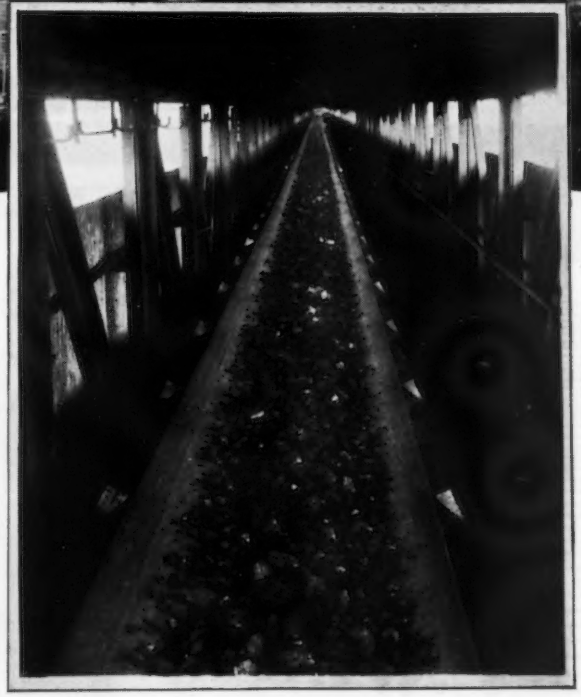

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Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

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Simply by tightening with a spanner, they give a joint that is gasproof, leakproof, and can be broken and remade hundreds of times. The secret is an annealed copper ring which under pressure becomes an integral part of the tubing copper, steel or bundy.

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Copper all ends ¾" O.D to 1½" O.D with variations.

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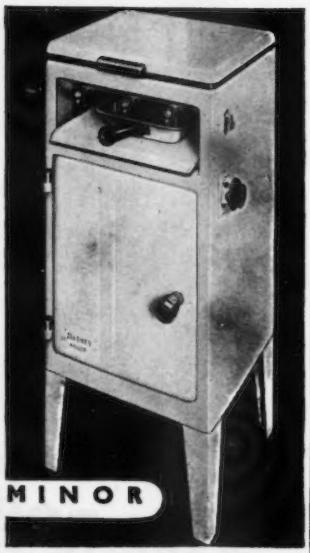
Approved and adopted by leading gas boards

The **Dainty** MINOR



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The latest Electrolux GAS REFRIGERATOR

. . . sized and priced for the majority of homes

She was quite right to *open the door!* How else can people see the two useful door shelves and the other well planned storage arrangements? Built for long, dependable *silent* service, the latest Electrolux Gas Refrigerator offers so much at a family man's price.

- **Shelf area 5 sq. ft. Adjustable shelves.**
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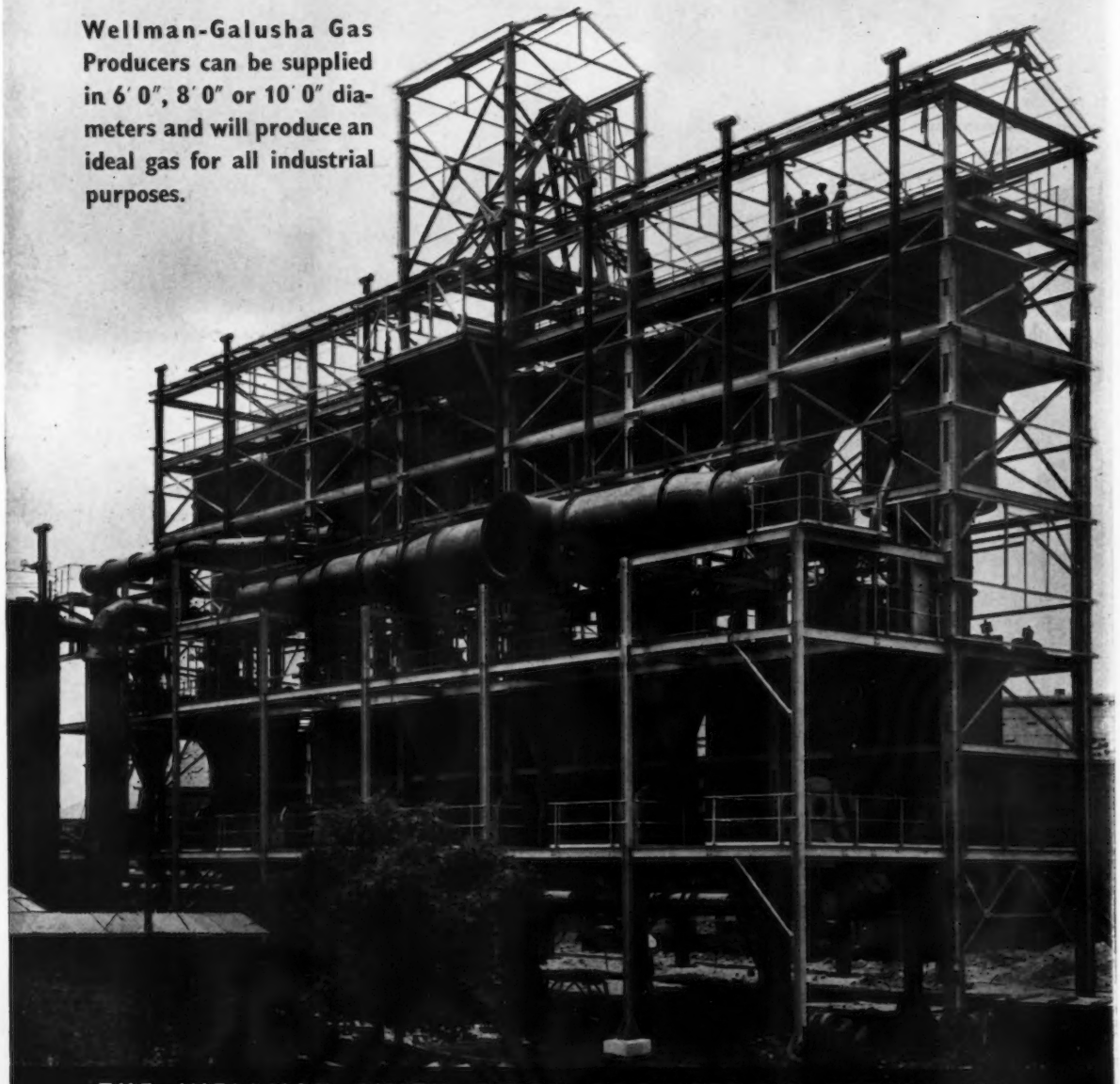
B

Wellman-Galusha Gas Producers

A battery of seven 10′ 0″ diameter Wellman-Galusha Gas Producers, for gasifying Natal anthracite coal—under construction at Vereeniging, Transvaal, South Africa. The installation is one of the most extensive gas producer plants to be erected initially as one battery in the British Commonwealth.

Wellman-Galusha Gas Producers can be supplied in 6′ 0″, 8′ 0″ or 10′ 0″ diameters and will produce an ideal gas for all industrial purposes.



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A Superior Clamp at low cost.

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Complete size range from 2½ inch to 48 inch.

Proper weight and design to provide strength and sealing power.

Installation—quick and easy.

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Telephone: Abbey 5238 Telegrams: Dresclam Sowest London.

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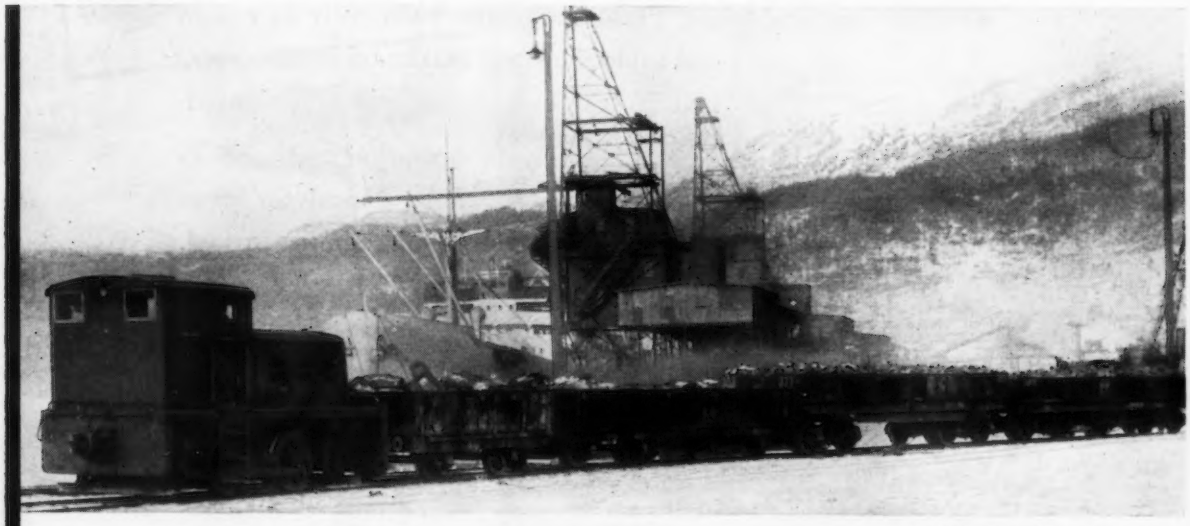

150 B.H.P. Fowler diesel locomotive shunting ore in Sauda, Norway.

Fowler diesel power in Norway

Industrial undertakings throughout the world choose Fowler diesel power

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Cut the liver into slices ¼" thick. Brush with melted margarine, season to taste, and place in base of grill pan. Slice onion into rings, toss in flour, and saute in margarine around the liver 4—5 mins.

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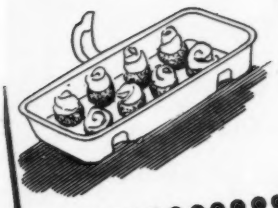
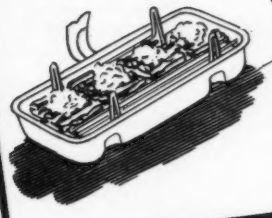
TOMATO CUPS with ROLLED FILLETS of PLAICE



Scoop out pulp from large tomatoes. Prepare and season fillets, sprinkle with lemon juice and roll, skin side innermost. Place in tomatoes with nuts of margarine on top. Brush tomatoes with margarine. Grill 10-15 mins. Garnish with parsley.

FOR SUPPER...

SARDINES with CREAM SAUCE



Melt margarine, add breadcrumbs and milk. Beat thoroughly. Add chopped hard-boiled eggs and seasoning. Keep warm till needed. Grill sardines gently. Serve on buttered toast, covered with the sauce.

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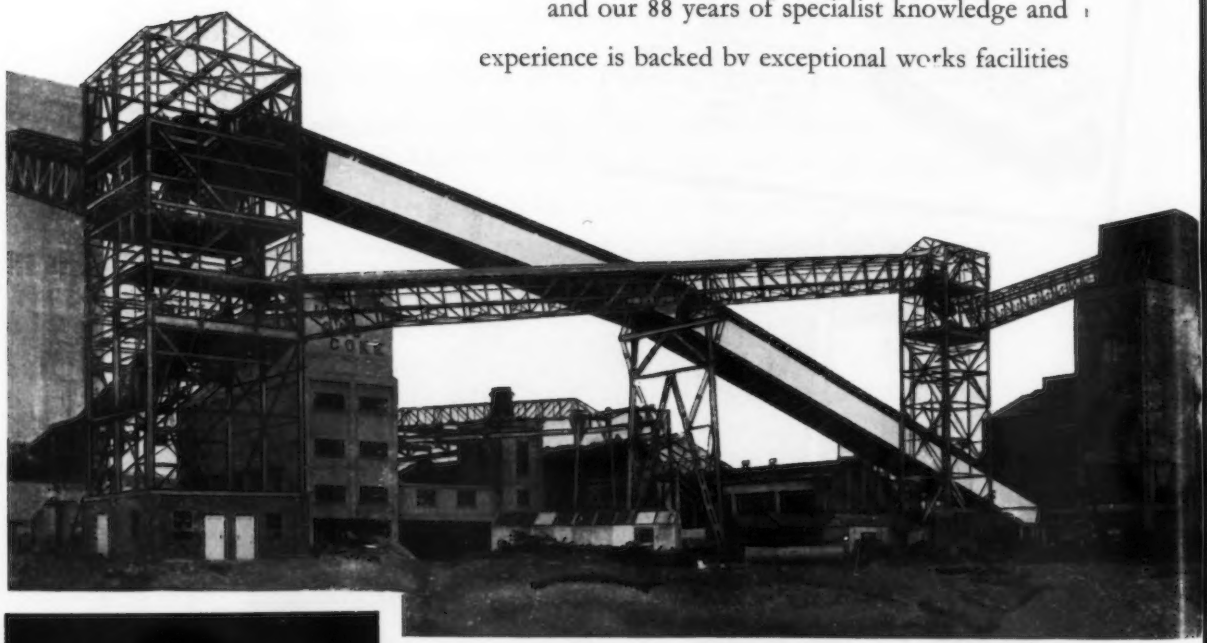

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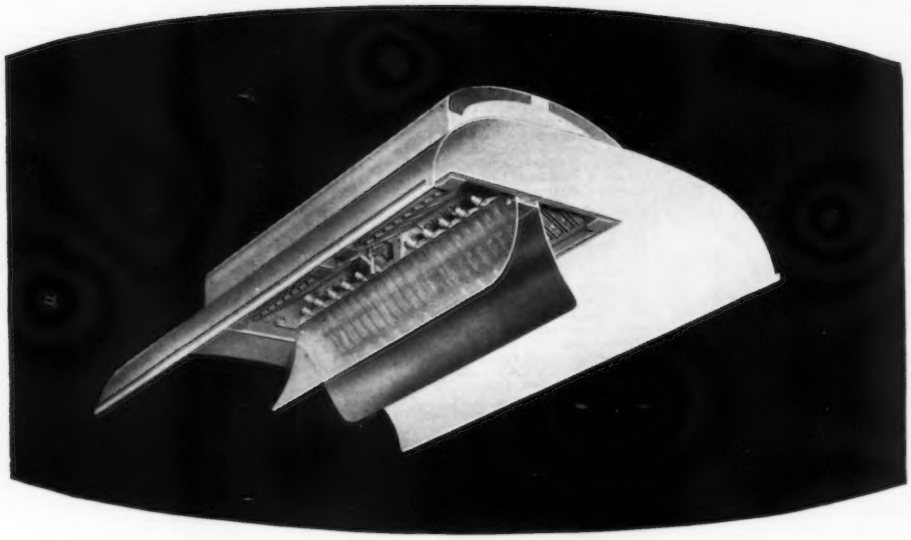

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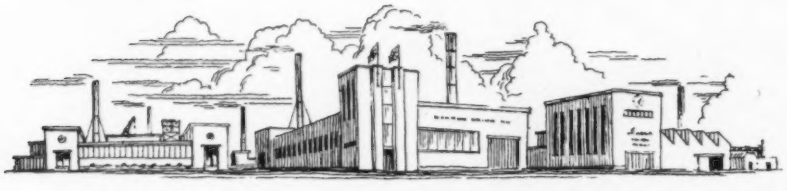

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Gas Journal

VOL. 283 NO. 4812 August 24, 1955

107TH YEAR

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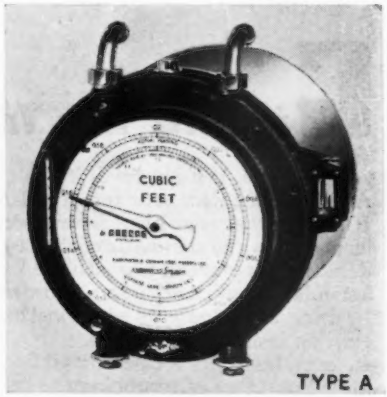

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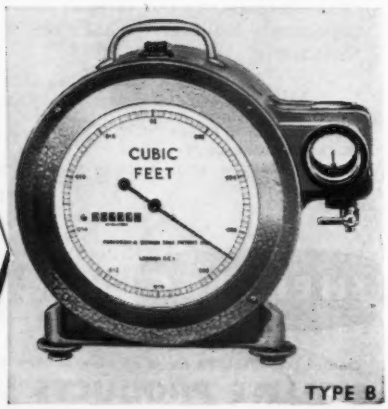

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Gas Journal

VOLUME 283. No. 4812. AUGUST 24, 1955. 107th YEAR

A Sales Challenge

AMONG gas salesmen, the prize of the year is the Challenge Trophy presented by the Gas Council. Each salesmen's circle throughout the industry submits a selected paper, and these are judged by an adjudicating panel. The winner has the honour of receiving the challenge cup at the Gas Sales and Service Conference and then carries it back to his circle until the next year. For the second year running, the prize has gone to the Eastern Gas Board, although last year's winner, Mr. H. W. Merrison, belongs to the Tottenham District Circle, and this year's winner, Mr. G. H. Hales, belongs to the Watford Division. Mr. Hales, who is Assistant Publicity and Sales Officer in his Division, well deserved his success, and his paper entitled, 'Thinking of Selling?' is likely to be regarded as one of the most telling contributions to our sales literature. The winning paper is published in full in the August issue of 'GAS SERVICE AND DOMESTIC COKE.' In these columns we can do no more than give some indication of the scope of the paper and quote some of the more telling points which the author makes. For once, this is a real sales paper. It is in no way concerned with technical knowledge, appliance efficiencies, combustion characteristics, and fitting instructions.

The author is at pains to explain his determination to divorce the technical aspects of the salesman's work from the fundamental human relationships involved. As he rightly points out, the customer takes for granted the salesman's technical knowledge, but what the customer does not take for granted is that she will be received with pleasure and respect or that the salesman will do all he can to satisfy her needs. Nor does she expect to be treated as just another customer. The good salesman, suggests Mr. Hales, must not be put off because of delivery delays or overworked fitting staff. He must not allow others to put him off for long with refusals. It is his job to keep worrying them, the district manager included, and never to give up until his customer has the appliance fixed and working and giving satisfaction in her home. He maintains that the customer will not mind waiting if she knows that the salesman is button-holing everybody in an endeavour to give her what she wants. Indeed she may even enjoy the idea. We cannot resist the suggestion that all whose job it is to work in gas board showrooms should cut out this section of the paper, mount it, frame it, and hang it over their beds at night, where it will be noted each morning before the salesman sets out for his day's work.

Mr. Hales has a clear idea of what a gas salesman should be and what he should do, but he does not lapse into a welter of time-worn platitudes about the fact that the salesman should wear a clean collar, a blue suit, and regard his job as a full-blown spiritual experience. However, the author is not being sentimental when he suggests that the good salesman sells little happinesses and satisfactions when he puts a smile and a compliment into the sometimes dreary and monotonous round of the housewife, and when he gives away these treasures to his customers like bouquets; for his fee, he takes the customer's friendliness and goodwill. It may well be that the satisfied customer will come back not because a particular salesman sold her this or that appliance or because he explained how a gas refrigerator works, but because he gave her personal satisfaction and pleasure, made her feel good, made her smile, made her feel pleasure, showed her wisdom and good taste, made her feel important and made her feel happy in herself. We also like the author's insistence that the salesman should not have lost all diffidence because that is what most people dislike about the so-called high pressure salesman.

From the general, Mr. Hales whittles his paper down to the particular and examines the number of different types of sales, seeking to discover at what point some of these may have misfired. He rightly maintains that many salesmen find it difficult to close the sale and lead it to its proper conclusion. He is scornful of the man who pretends to be doing anything but selling, and he emphasizes that the salesman who does not make it perfectly clear that he wants the customer to buy, by trying to close the sale, may not only lose the sale but may inadvertently convey the impression that he is not wholly confident in the goods. He stresses the importance of asking the customer the right questions and of injecting into his conversation more and more those two magic selling words 'you' and 'yours.' He explains the value of allowing the customer to try things for herself, even to touching the enamel or testing the mechanism of a refrigerator door. Reading the paper one cannot help thinking of those tremendously glib but successful gentlemen who sell their wares in the gallery at the Ideal Home Exhibition. Admittedly, they are merely professional demonstrators, most of them rootless and prepared to sell anything to anybody, but they

certainly follow most of the rules laid down in this paper. One section which appealed to us particularly was that concerned with the all-too-common insistence on forcing facts down the customer's throat, without explaining their significance. For example, the author quotes the sort of information to be found on a great deal of gas appliance literature: 'The machine is only 31 in. high; the water is heated by gas; there is a special viewing mirror, etc.' He points out that these facts will only make sense to the buyer if they are presented like this: 'The machine is only 31 in. high—it will go under your draining board easily; the water is heated by gas—by far the quickest method and you can actually boil clothes as often as you wish; there is a special viewing mirror—no more getting down on all fours to see if the gas is alight,' and so on. How many prospective customers, we wonder, are given leaflets listing similar unexplained and therefore useless information.

Many words and fine language are out since the vocabulary of the average Briton is but a few thousand words, and there is little fear that such simplicity will appear to 'talk down' to the customer. An experiment suggested by the author takes the form of asking women folk of one's acquaintance what they understand by such words as 'ignition,' 'solid smokeless fuel,' 'agitator,' 'circulator,' 'back boiler conversion unit,' etc. The result should convince anyone of the importance of using only the universal language of plain words. We are glad to note Mr. Hales' insistence that the underlying reason for a customer's enquiry for a certain appliance may not be as obvious as it seems, bearing in mind the fact that people buy for such diverse reasons as a desire for admiration, a desire to own fine and beautiful things, good health, security, pride, curiosity (especially about rich or famous people), respect for tradition, and ambition, and the desire to excel. It may well be that, although the salesman may imagine that Mr. Brown is buying a new refrigerator because his present one is ten years old, the true fact is that he is buying a new refrigerator because Mrs. Brown has repeatedly mentioned a new refrigerator since the Jones's had one.

The paper is outstanding because it brushes aside many of the cobwebs which all too often impair a realistic view of the selling processes. We hope that the paper will be read by all those whose work brings them into contact with consumers because, now perhaps more than at any time in the past, our industry will rely for its future prosperity on the energy and skill of its ambassadors in the showroom and on the district.

Reporting Back

BRITISH industry has learnt much from the reports of the 40 productivity teams and the 20 specialist teams which visited the United States between 1950 and 1953 under the auspices of the Anglo-American Council on Productivity (the United Kingdom Section of which became the British Productivity Council). The gas industry had its own Productivity Team, under the leadership of Mr. J. H. Dyde, whose report published early in 1953 helped to broaden the outlook particularly of those sections of the industry concerned with high pressure distribution, mechanized mainlaying, and consumer-appeal in the sales of appliances. There is as yet no counterpart in the British gas industry of the rapid exploitation of natural gas resources which in the last decade has completely transformed the economic and technical aspects of the American gas industry; nevertheless, in spite of the great difference in character of the two industries the Productivity Team was able to indicate many ways in which American practice could, with advantage, be applied to the British gas industry.

Quite independently of the work of the British Productivity Council, the United States Government, through the Economic Co-operation Administration and its successor, the Mutual Security Agency, provided funds for study in the United States by 63 junior managers from British industry, and a report prepared from the reports of the four management groups attending courses at the Universities of Cincinnati and Syracuse during 1951-52 and 1952-53, has now been published under the title of *Reporting Back*. The report is of more than ordinary interest to us in that one of its joint authors is Mr. James C. Ingram, Secretary of the West Midlands Gas Board, who contributes a special article on the report on p. 511 of this issue. When in 1951-52 Mr. Ingram was Group Leader at the Syracuse University he was Administrative Officer at the national headquarters of the British (now Central) Electricity Authority, from which post he transferred his energies to the gas industry as successor to Mr. F. A. Cureton as Secretary at the Birmingham headquarters of the West Midlands Gas Board a little less than a year ago.

Both the report under review and Mr. Ingram's comments are well worthy of study. Throughout the report the authors have described the best examples of management and techniques which they found in America, and their impressions of the most significant factors in the best American practice are summarized as follows: The high social prestige of business in general and of the manager in particular; the restlessness which pervades American life, characterized by impatience with conventional methods and readiness to abandon unsuccessful ventures; the dogmatic belief in competition and in the individual; the degree and extent of the applications of modern techniques, and the 'gadget-mindedness of the people; the dogmatic belief in mass consumer-satisfaction,' with the corrollaries of mass production, standardization, and simplification; the extent to which production, price, employment, and economic existence are governed by the volume of sales; the resultant cost-consciousness in every department and at all levels, and the widespread application of budgetary and cost control systems; the corresponding delegation of responsibility to the lowest levels of supervision, and the great attention devoted to the training of supervisors; the vitality of the trades unions, and the care and expenditure now being lavished on promoting good industrial and community relations; and the belief in management education and training at all levels both in the universities and in industry, the close co-operation between the universities and industry, and in particular the care devoted by the universities and business schools to preparing students for business administration.

It is not claimed that what is recorded in the report will solve many British problems in the short run;

indeed, Mr. Ingram points out that there are many examples in the United States, as elsewhere, of poor, uninspired management, but the report deals only with impressions of the best practice.

TRAINING BOILER OPERATORS

FOR obvious reasons, the efficient operation of steam-raising boilers has become a subject of vital urgency to the whole of industry in this country. Since the advent of scarce coal, the need to train boiler operators in the best possible use of this now precious material has occupied the minds of industrialists and fuel technologists alike. Recently coal has taken yet another dizzy move upward in the price spiral and the Clean Air Bill has ceased to be only a pious hope, both very potent reasons for ensuring that not one ton, not one pound, of coal is wasted through inefficient boiler operation.

The National Industrial Fuel Efficiency Service (N.I.F.E.S.) has had this subject under very careful consideration ever since its inception and has done all that it can to foster a sense of urgency in the conservation of boiler fuel. Now N.I.F.E.S. has produced a brochure on the training of boiler operators entitled 'Cut Fuel Costs by Training Boiler Operators'. This leaflet gives details of the courses of instruction which are available throughout the country at technical colleges; it also announces the new 'N.I.F.E.S. Course of Training for Boiler Operators' which is to commence in October. As the leaflet points out, 'the age groups of the men involved, the need for working shifts and travelling difficulties often act as deterrents to intending students, as far as technical college courses are concerned.' Consequently, N.I.F.E.S. had the idea of establishing this special course of its own in which practical training on selected boiler plants is to be given to students by qualified engineers of the Service. The practical work is to be supplemented by home study material which is to be sent to the students through the post. Where possible, it is proposed that each man should be trained at a plant similar to his own, and the course is designed to last 21 weeks, consisting of six three-week instruction periods, and a three-week revision period. In each instruction cycle, the men will receive, by post, enough home study material to prepare them for one day of practical instruction on site in the third week, and the ultimate object of the course is to prepare men for the Boiler Operators' Certificate Examination of the City and Guilds of the London Institute. The fee for each man to attend the course is only five guineas, and since this is no more than the cost of a ton of coal, there would seem to be few better investments for the industrialist than to ensure that his boiler operators take advantage of it. By this means he can do the country a service and save himself some money at the same time for, quite apart from the saving of coal to be effected by improved boiler operation, there is the fact that such operation can offer a very substantial contribution towards the cleaner atmosphere which we all desire. All success, therefore, to N.I.F.E.S.' new scheme—let us hope that it will receive the wide support that it deserves.

FLOODLIGHT

AUTUMN is at hand, and *Floodlight*, the London County Council's annual guide to evening classes, is on the bookstalls and in the bookshops again. Priced at 6d. (by post 8d.) it appears this year in an attractive new binding, displaying an aerial view of London with a floodlight on the County Hall as the headquarters of the London education service. Its pages provide an introduction to a great range of instruction and opportunity available to Londoners for only a few shillings a year. More than 500 subjects are listed, from accountancy to zoology, and well over a quarter of a million people are expected to enrol, as they have done for many years past, at the scores of institutes maintained or aided by the L.C.C. This year enrolment week starts on September 19. In recent years approximately 150,000 students have put in about 9¼ mill. hours a year at the various types of evening institutes, and another 100,000 have attended evening classes at polytechnics, technical colleges, colleges of commerce and schools of art. In addition there were during last session 11,000 full-time day students and 28,000 part-time day students attending these establishments, and about 11,000 students at day colleges.

Our primary interest in *Floodlight* is concerned with those subjects of direct concern to young people coming into the gas industry, among which we notice chemical engineering and chemistry, fuel technology, gas engineering, gas fitting, heating and ventilation, refractories and refrigeration, smoke abatement and steam utilization. But London's evening classes are designed to do more than provide education for one's chosen career. Anyone over 15 who has left school can join a class for study or recreation. There is no upper age limit, and indeed in some classes people over 70 are to be found. Many subjects bearing on matters of topical interest are included in the syllabus. Those keen on space travel and atomic development will find satisfaction in the popular lectures on astronomy and atomic power; for advanced science students there are courses in nuclear physics and radioactivity. The present-day emphasis on industrial development and automation is reflected in the courses available in industrial experimentation and control techniques, electronics, time and motion study, industrial relations, management studies, and foremanship. Many languages are taught; 11 colleges and institutes will this session provide courses in Russian. Classes in international and current affairs, television and town planning, will also attract many students.

The cost of the different types of course is surprisingly small. For example, the inclusive fee for men's, women's, recreational and junior men's institutes is 10s. a session (September-July) or 4s. a term, and students are entitled on payment to attend all classes (except in dancing). For those under 18, these fees are halved. A technical course leading to a final degree or professional equivalent costs only £2 5s. for a session. It would be difficult to acquire learning more cheaply. The L.C.C. evening institutes are not only places of instruction; they are also clubs with an active social life which may include dances, whist drives, debates and concerts.

TOWN GAS BY CATALYTIC CRACKING OF PROPANE

We regret that in the article which appeared on pp. 255 and 256 of our July 27 issue under this title, the percentages of propane required for enrichment of the reactor gas were incorrectly stated. The paragraph on p. 256 commencing 'The gas produced by the reactor . . . .' should read as follows:—

'The gas produced by the reactor is enriched by adding further propane to the supply, and approximately 10.0% of propane is required to give a calorific value of 400 B.Th.U. per cu.ft. and 12.2% to give a calorific value of 450 B.Th.U. per cu.ft.'

Following from this the figures given in Table I should read:—

TABLE I.—Gas Properties

Calorific value, B.Th.U. per cu. ft.	400	450	500	550
Propane for enrichment, % ..	10.0	12.2	14.4	16.6
Wobbe index	436	486	535	583
Specific gravity (air=1)	0.841	0.857	0.875	0.890

Personal Notes

MR. AUBREY COLE, District Engineer and Manager at Cleckheaton, has been appointed Group Engineer and Deputy Group General Manager of the Hull Group, North Eastern Gas Board. Mr. J. Gaunt, who has been Mr. Cole's deputy, has been promoted to the position of District Engineer and Manager of the Spenborough District. Over 50 colleagues and friends attended a party at Cleckheaton on August 17 to celebrate the two events, the chief guests being Mr. J. G. Tilley, Manager of the Huddersfield-Halifax Group, and Mrs. Tilley. After supper Mr. Gaunt presented Mr. Cole with a stainless steel wristlet watch, a gift from the staff, and Miss Greenwood presented a bouquet to Mrs. Cole. In his reply Mr. Cole paid tribute to the loyal co-operation he had received during his four years at Cleckheaton. Mr. Tilley congratulated Mr. Cole, whom he felt certain had a great future before him. Although he was sorry he was leaving the Huddersfield-Halifax Group, Mr. Tilley looked forward to meeting Mr. Cole in his new capacity at future business meetings. Mr. Gaunt added a popular and humorous touch by creating Mr. Cole 'Deputy Sheriff of Cleckheaton,' pinning a resplendent badge on his coat lapel, which he wore for the rest of the evening.

MR. G. G. JACKSON, B.SC., has been appointed as a Chemical Engineer of Sharples Centrifuges, Ltd., and will be based on the Company's Tower House Laboratories at Stroud. Mr. Jackson was formerly with the Atomic Energy Research Establishment at Harwell, and will now be particularly concerned with Sharples' field tests and the Technical Advisory Section's work.

MR. F. A. RHEAD, Gas Manager and Engineer at Peterborough, was involved in a collision with a van at a road junction near Cambridge while travelling with his wife by car from Peterborough to Dover to begin a holiday on the Continent. Mrs. Rhead, who was driving the car at the time of the accident, sustained a cracked rib, and another passenger in the car also received minor injuries, but the car was severely damaged. The members of the party went back to Peterborough in a hired car and after a few days' rest set off for Switzerland by air.

MR. W. RONALD EDGAR has taken over the task of National Organizer to the Amateur Swimming Association's Olympic Training Fund. H.M. the Queen is Patron of the Association. Mr. Edgar informs us that subscriptions or donations would be welcomed from any firms or undertakings interested in the furtherance of swimming in this country. His address is The Elms, Birdham, Chichester, Sussex.

MR. A. WHITFIELD, Production Manager of Widnes Foundry & Engineering Co., Ltd., and MR. H. L. SANDERS, Chief Draughtsman and Designer, have been appointed to the Board of Directors. Mr. Whitfield has been with the Company for 17 years and Mr. Sanders for 18 years.

MR. HARRY DOUGLASS (Member of the General Council of the Trades Union Congress and General Secretary of the Iron and Steel Trades' Confederation), MR. E. L. GETHIN, B.SC. (Supplies and Production Adviser, British Transport Commission), and MR. R. J. MOFFAT, M.B.E. (Director-General of Marketing, National Coal Board), have been appointed by the Minister of Fuel and Power to be members of the Industrial Coal Consumers' Council. Mr. Moffat has also been appointed to be a member of the Domestic Coal Consumers' Council.

MR. C. S. STACKPOLE, General Sales Manager, Heating and Cooling Division, Union Asbestos & Rubber Company, Chicago, has been appointed Managing Director of the American Gas Association, the national association of the fourteen and a half billion dollar gas industry. He succeeds H. CARL WOLF, who resigned earlier this year because of illness and who subsequently died on June 26, 1955.

SIR CHRISTOPHER F. A. WARNER, K.C.M.G., has been appointed a Director of the Imperial Continental Gas Association.

Obituary

MR. THOMAS ROBERT HISLOP MCGILL of Gasworks House, Bell Lane, Rugeley, Manager and Engineer at Rugeley gasworks, has died at his home at the age of 61.

The Government Loan Scheme for industrial fuel saving equipment has passed the £1,000,000 mark. Approval has been given to loans for schemes estimated to save 90,000 tons of coal a year at a capital cost of about £12 per ton of coal saved. The Scheme, which remains open, is for the granting of loans free of interest for the first two years to help the smaller industrialist particularly.

Diary

September 2.—WALES G.C.C.: Town Hall, Llandudno, 11 a.m.

September 6.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 11 a.m.

September 7.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m..

September 9.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Visit to the works of the Derbyshire Silica Firebrick Co., Ltd., Friden, Hartington, near Buxton.

September 12-14.—GAS COUNCIL: Gas Sales and Service Conference. 'Heads of Ayr' Holiday Camp, Ayr. (For programme see 'JOURNAL,' July 20, p. 209.)

September 13-16. — ASSOCIATION OF PUBLIC LIGHTING ENGINEERS: Annual Conference, Folkestone.

September 19. — WEST MIDLANDS G.C.C.: Committee Room, Gas Offices, Edmund Street, Birmingham 3. 2.30 p.m.

September 19-20.—EASTERN SECTION, I.G.E.: Annual General Meeting, Chairman's Address, W. A. Evetts; 'Some Problems involved in the Manufacture and Distribution of Gas,' B. Wilkinson; Grand Hotel, Sheringham.

September 21.—MANCHESTER JUNIORS: Visit to K.L. Cranes, Ltd., Letchworth.

September 22. — STANTON IRONWORKS CO., LTD.: Mr. Geoffrey Lloyd, Minister of Fuel and Power, opens coke oven extensions.

September 22.—SCOTTISH ASSOCIATION OF GAS MANAGERS: Annual General Meeting, Town Hall, Inverness.

September 24.—EASTERN JUNIORS: Presidential Meeting, Norwich.

September 28.—IRISH GAS ASSOCIATION: Annual Meeting; Presidential Address, S. L. Doyle (Cork); 'Gas Distribution,' A. L. Allen and J. J. Mahoney; Imperial Hotel, Cork, 10.30 a.m.; afternoon outing to Blarney Castle; annual dinner, Imperial Hotel, 7.30 p.m.

September 29.—NORTH THAMES G.C.C.: Westminster City Hall, 2.30 p.m.

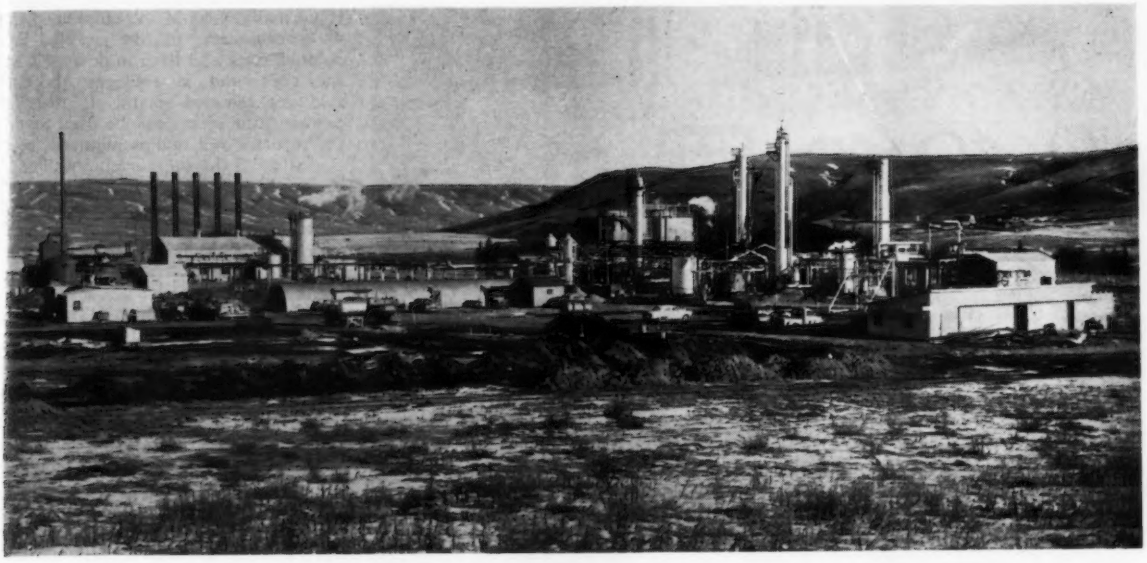
October 4.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, S.W.1, 11 a.m.

October 5.—MIDLAND JUNIORS: Report on the Paris visit. Birmingham.

October 14.—MIDLAND SECTION, I.G.E.: Autumn Meeting, Palace Hotel, Buxton. 11.0 a.m. Paper by H. Oliver and K. Carr: 'Some Observations on Refractories for Gas Retorts.'

October 19.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting. Address by Chairman, W. B. Claridge.

October 25.—EASTERN G.C.C.: Connaught Rooms, Great Queen Street, W.C.2. 11 a.m.



The heater converters of the sulphur plant are seen on the far left. Left centre is the boiler house with its five stacks rising in the background. On the right are the processing towers which recover natural gasoline and prepare the natural gas for industrial and domestic use.

RECOVERY OF SULPHUR FROM OIL IN CANADA

Shell Oil Co. of Canada Ltd. has two sulphur recovery plants in operation at Jumping Pound Field, Alberta. This illustrated article briefly describes both plants and the processes employed.

IT is generally agreed that the importance of sulphur as a raw material in our industrial economy can hardly be overestimated. It is also quite clear that the removal of sulphur from the fuels which we burn is eminently desirable, not only as a source of supply of this essential element, but also in order to prevent the pollution of the atmosphere with the noxious and corrosive oxides of sulphur which are released during combustion. With the increasing use of oil in this country, the removal of sulphur which it contains has become a matter of concern to both users and suppliers. It is, therefore, interesting to discover how one of the major oil companies, 'Shell,' is tackling this problem in Canada.

Sulphur Recovery Plant No. 1

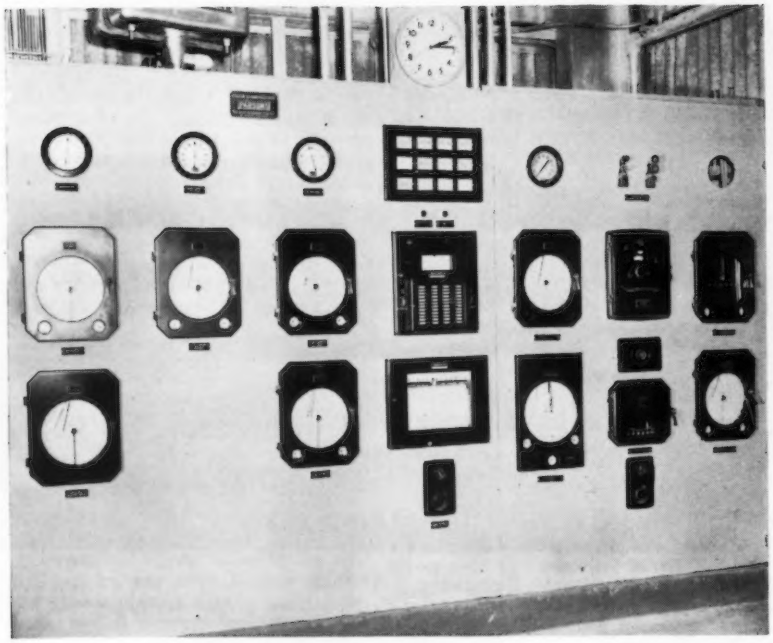
This plant is designed to recover 30 long tons per day of sulphur from acid gases leaving the hydrogen sulphide and carbon dioxide removal plant at Jumping Pound. The feed gas to the sulphur plant is available at 100°F. and 5 lb. per sq. in., and the plant is designed for the following feed gas composition;—H_2S, 33.23%; CO_2, 58.97%; H_2O, 5.80%; CH_4, 2.00%.

A brief description of the process flow is as follows:—

Acid feed gas bearing hydrogen sulphide is burned in a reaction furnace with a controlled amount of air. One-third of the hydrogen sulphide is oxidized to sulphur dioxide and any hydrocarbons in the gas fed to the furnace are completely burned. A portion of the sulphur dioxide so formed reacts in the furnace with some of the remaining hydrogen sulphide to form elemental sulphur. Hot gases from the furnace are cooled in a waste heat boiler (where steam at 250 lb. per sq. in. is generated) and further cooled in a low pressure (75 lb. per sq. in.) steam generator. The gases are then passed into a first stage converter where additional conversion takes place, with a consequent elevation in temperature of the converter exit gas. Gas from the first converter is then cooled in a boiler feed water economizer and is then passed into a second stage converter where additional conversion takes place. Gas from the second stage converter then passes into a wash tower where it is cooled and sulphur is condensed from the gas by direct contact with a re-circulated stream of liquid sulphur. The re-circulating sulphur is cooled by coils in the base of the wash tower. Liquid sulphur product overflows by gravity from the base of the wash tower into a liquid sulphur run-down pit. The product sulphur from the run-down pit is then pumped to storage piles where it is atmospherically cooled and solidified.

The equipment comprising the plant and the flow through the same may be described as follows:—

Acid feed gas bearing hydrogen sulphide enters the sulphur recovery plant, and is fed into a reactor furnace. In the reactor furnace the gas is partially burned with an automatically controlled amount of air furnished by a combustion air blower.



Plant control panel with instruments for plant No. 1 on the right and instruments for plant No. 2 in the middle and on the left.

Partially combusted gases from the reactor furnace, at about 1,650°F. are then cooled to approximately 650°F. by a waste heat boiler with a consequent generation of approximately 8,200 lb. per hour of steam at 250 lb. per in. The gases from the waste heat boiler are then passed into a steam generator were the gases are further cooled to about 425°F. and about 2,200 lb. of steam at 75 lb. per sq. in. are generated. The cooling gases from the steam generator are then passed into the primary bed of a catalytic converter where the components of the gas stream are reacted to produce elemental sulphur in the vapour state. The reaction is exothermic, and therefore the gases leaving the converter are hotter than the feed gases. The hot gases pass into a feed water economizer where they are cooled to approximately 500°F. The cooled gases from the feed water economizer then pass into the final bed of the catalytic converter where additional conversion to elemental sulphur takes place. The hot gases from the catalytic converter, containing the sulphur in the vapour state, are then passed into a sulphur wash tower where they are cooled to approximately 275°F. by direct contact with a recirculated stream of liquid sulphur. At this temperature the sulphur vapour is condensed from the gas. Sulphur circulation in the tower is provided by a sulphur circulating pump. The circulating sulphur is cooled by wash tower cooling coils. The liquid sulphur product flows by gravity from the tower basin into the sulphur run-down pit from which it is pumped by a sulphur product pump to the solid sulphur stockpiles. The liquid sulphur is atmospherically cooled and solidified at the stockpiles.

The gas leaving the wash tower joins the waste gas from Sulphur Plant No. 2 and is burned in an incinerator to convert all hydrogen sulphide and sulphur compounds to sulphur dioxide before being discharged to the atmosphere.

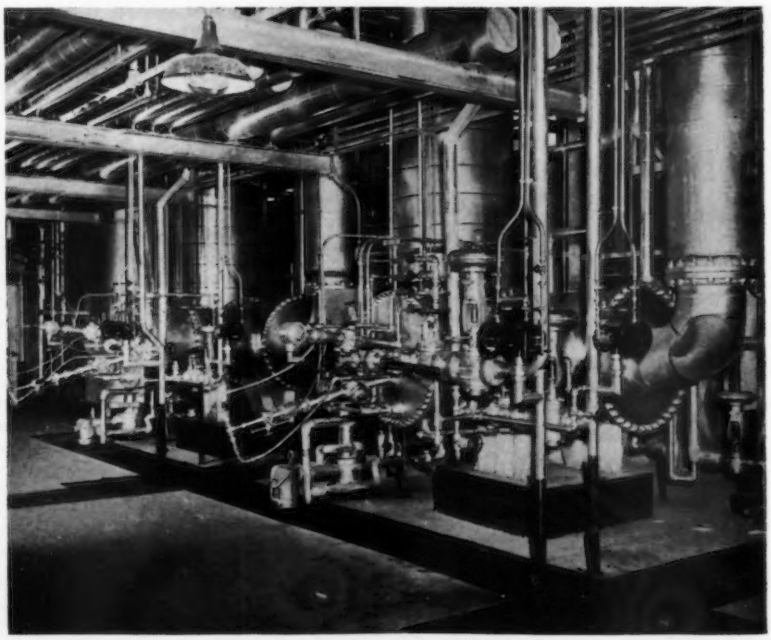
The steam incidentally generated in the sulphur recovery process by the waste heat boiler and by the steam generator is normally used in the sulphur plant—as heating steam for the jacketed liquid sulphur lines and the run-down pit heating coils—and in the gas sweetening acid gas removal—plant. If necessary, however, the steam can be used to drive the turbines and pumps required for the operation of the sulphur plant. The low pressure (6 lb. per sq. in.) exhaust steam from the turbine drivers plus any excess steam at 15 lb. per sq. in. from the gas sweetening plant is condensed in an air-cooled condenser. The steam condensate from this is collected in a condensate accumulator, from which it is pumped by a boiler feed water pump, either into the steam generator or back to the gas sweetening plant boiler house. Feed water for the waste heat boiler is obtained from the gas sweetening plant boiler house.

Sulphur Recovery Plant No. 2

No. 2 plant is designed to produce 53.4 long tons per day of sulphur having a minimum purity of 99.5% from an acid gas stream of the following composition:—H_2S, 32.44%; CO_2, 57.24%; H_2O, 5.32%; hydrocarbons, 5.00%. The process is basically that of burning one-third of the hydrogen sulphur to sulphur dioxide and then reacting this sulphur dioxide with the remaining quantity of hydrogen sulphide to form sulphur and water vapour.

The process flow for plant No. 2 and the equipment comprising the plant, may be described as follows:—

The inlet acid gas passes through a knockout drum which contains mesh packing to remove entrained liquids. The acid gas plus sufficient air to burn one-third of the hydrogen sulphide to sulphur dioxide flows to an external combustion chamber mounted on a waste heat boiler. Small side streams of gas and air are piped to auxiliary burners. Some sulphur is formed in the waste heat boiler and the heats of combustion and reac-



On the extreme left is the feed gas scrubber, then the first sulphur condenser, first auxiliary burner, second sulphur condenser, and second auxiliary burner.

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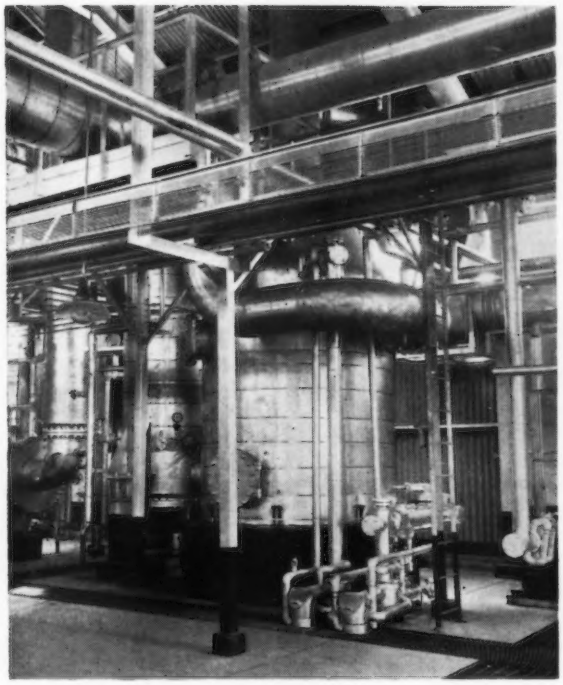
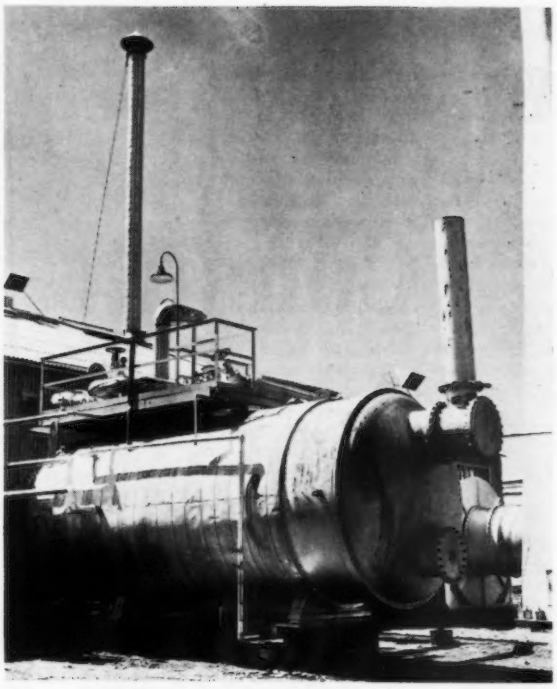


On the extreme left is the second auxiliary burner, then the third sulphur condenser and the tail gas scrubber-coalescer which collects any entrained liquid sulphur.

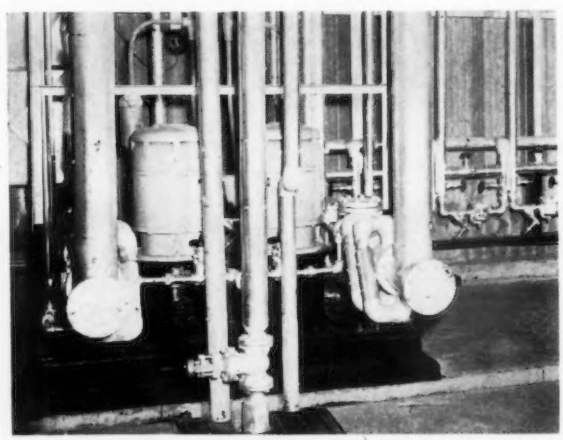


Boiler portion of the waste heat boiler. The tail gas incinerator stack is on the right and the auxiliary tail gas stack is in the left background.

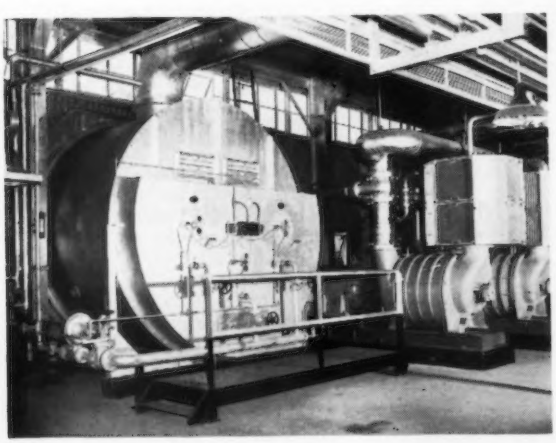
tion are used to generate steam at 250 lb. per sq. in. The gas stream flows from the waste heat boiler to the first condenser where the generation of steam at 75 lb. per sq. in. removes additional heat, cools the gas to 370°F., and condenses a portion of the sulphur. The liquid sulphur flows by gravity to the sulphur pit.

The gases leaving the first condenser are re-heated by an auxiliary burner to a temperature of 420 to 450°F. and then flow to the first catalytic converter. Here hydrogen sulphide and sulphur dioxide react further to form sulphur. The reaction is exothermic and the heat generated raises the temperature of the gas some 200 to 230°F. To cool the gas and condense the sulphur vapour, the hot gases from the first converter are passed through another condenser where the heat is removed by the generation of steam at 75 lb. per sq. in. The liquid sulphur flows to the sulphur pit and the cool gases pass to the secondary auxiliary burner where they are heated to 475 to 500°F. before they enter the second catalytic converter. In the second converter additional sulphur is produced and the heat of reaction increases the gas temperature some 20 to 30°F. The sulphur in the hot gases leaving the second converter is condensed in the third condenser which serves as a boiler water preheater. The gas leaves this condenser at 300 to 310°F. and the condensed sulphur flows to the sulphur pit.

To collect any entrained liquid sulphur, the effluent gas from the third condenser is passed through a coalescer. The gas leaving the coalescer is combined with the gas from No. 1 plant and flows to an incinerator where residual hydrogen sulphide and sulphur compounds are converted to sulphur dioxide before the tail gas is vented to the atmosphere through a 150 ft. stack.



The sulphur run-down pits showing the product pumps.



The burner end of the tail gas incinerator combustion chamber with the plant air blowers on the right.

The American Attitude to Management

By J. C. INGRAM, M.A. Secretary, West Midlands Gas Board.

'REPORTING BACK', published by the British nstitute of Management, under the auspices of the British roductivity Council, is the story of an imaginative experi- ent. The late Sir Stafford Cripps, and Mr. Paul Hoffman, ecided that the work of the numerous Productivity Teams hich had visited America should be followed up and consoli- ated by selecting a number of young men and women to pend at least nine months in that country to study 'the philosophy, principles and techniques of American business management.' Between 1951 and 1953, therefore, four groups of 'junior' and 'middle' managers, of whom I was one, and numbering 63 in all, were chosen to take advantage of this proposal.

Thus, our background and the aims of our stay in the United States differed from those of the Productivity Teams. We stayed longer and saw more. We came from many parts of British industry. We have no collective specialist knowledge but were nearly all in responsible positions in industry, or engaged in teaching management subjects. Our ages ranged from 26 to 40 with an average age of 32. During our stay we completed an intensive academic programme at a university and between us visited 452 firms, trades unions, business associations, and Government departments.

'Reporting Back' clearly cannot claim to be exhaustive in its treatment of all the individual techniques comprising overall management in the fields of production, administration and finance. What we hope does emerge from a reading of it is not so much a description of the techniques themselves, or their construction—although many examples are given in the text—but rather the novel and enthusiastic application of basic principles of good management practice, production and costing procedures. In other words, we found comparatively little that was really new to all of us, or which was not being applied to some extent, or could not be applied, in at least some sectors of industry at home. But the *attitude* of American managers, operatives and the people themselves, we thought, served most to account for some of their astonishing figures of productivity.

One retains innumerable vivid impressions of foremen, accountants, and production managers not merely setting targets as a guide to future effort, nor in the mere hope of achieving them but in the sure *expectation* of achieving them and of knowing precisely *why* variances from budget would occur; of delegation of responsibility to the lowest levels of supervision practised not from textbook precept but for compelling hard-headed business reasons. Workers and trades unions, the latter if a bit grudgingly, expected management to be keen, to review methods continually and to see that any management technique that can reasonably be harnessed to their task is used, and used efficiently. It is not easy to account for this universal keenness of approach except perhaps to say that, from the point of view of management and men alike, it 'pays off.'

Work Study, or, to use the American term for it 'Industrial Engineering', covers the whole field of plant layout, method study, job measurement, motion and time study and the measurement of plant efficiency, and its basic principles are applied, in one form or another, to most facets of continuous process and repetitive work. As long ago as 1948, a survey of 89 plants showed an average of 14 employees engaged on this work per 1,000 employed, an increase of 100% over 1945. Industrial engineers maintain very close ties with the design, inspection, and manufacturing sections of the organization. They realize that if their work is to be fully effective they must secure complete co-operation at every stage and their ideas and objectives must be fully understood before they can truly be accepted. To this end, and to combat the limitations which specialization has imposed on junior and middle managers, industrial engineers are recruited from both workshop and college, including arts graduates, as well as those from the scientific faculties, and are given assignments in various departments, including costing sections, during their training. Cost accountants are encouraged to take up this work, not only because of the contribution they can make but also because they, and the technically-qualified industrial engineers, are the better fitted, in the long run, to take up more responsible jobs in the 'line' management afterwards.

The Report includes sections on Management Production, Distribution, Finance, Labour, and Education and Training, the latter dealing with the programmes operated by companies and universities, and refers in some detail to the close liaison which exists between industry and the universities, and also comments on the Case Study Method.

The university course of study alternated with visits to industrial organizations. Visits were of varying lengths, from one day to two weeks, and were made by the groups as a whole and, in my own case, for 10 weeks, as an individual, to manufacturers and to public utility companies and Government departments.

The tempo in the utility field was, I thought, perhaps slower, and operating practices less spectacular, than in the repetitive sectors of manufacturing. Nevertheless, one could not fail to be impressed by the simplicity and efficiency of their methods and control which, during recent years, have shaken down into normal routine and are accepted as such. Their scale of operations—with some exceptions—was not so wide as not to bear comparison with those of an area gas or electricity board in this country. Despite lavish mechanization of procedures, staffing was generous even by British standards. As in other industries, budgetary control is highly developed and thoroughly understood at all levels, facilitating practical delegation of responsibility right 'down the line'; accounting procedures, operating instructions and all maintenance jobs, including detailed procedure for breakdowns, are all contained in comprehensive procedure manuals to serve as a useful basis for standard costing. Monthly billing, of course, is standard practice, and high load factors are maintained on the enormous batteries of punched card machines, or electronic computors, by their use for all accounting work, including payroll, stores control, personnel records, issue of cheques, property registers, and countless control extractions for the use of top management. One company planned to install an electronic computor at a cost of $750,000 and expected it would pay for itself in 18 months.

On the technical side, too, ingenuity was no less remarkable. Manning schedules of power stations frequently allowed for no more than 0.4 men per megawatt of installed capacity, whereas, in some of the newer C.E.A. stations, the ratio of 1.0 men per megawatt is considered good practice, and the national average is about 2.6. This practice, as in other American companies, reflects, of course, the traditional shortage of labour and is facilitated by elaborate instrumentation in combined electrical and boiler plant control rooms, with imaginative use made of television and remote controls. Coal handling, naturally enough, is also highly mechanized and, in one case, I was intrigued to hear of plans for pumping coal slurry over a distance of 28 miles to save double handling. Pulverized fuel ash, the disposal of which is causing such concern in Britain, is bagged and shipped over 2,000 miles for use in concrete dam construction, at a profit. Natural gas from the South is piped over tremendous distances and one pipeline I saw, 1,800 miles long, had been laid, in a number of sections concurrently, including excavation, jointing, wrapping and reinstating at an average rate of one mile a day.

We hope that our Report will not give the impression that all we saw was naively observed and uncritically accepted. There are many examples in the United States, as elsewhere, of poor, uninspired management but the Report deals only, as I think it should, with impressions of the best practice. What we have found to say will solve few British problems in the short run. Its essence really amounts to a philosophical appraisal of 'attitude'.

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General Consumer Service*

By F. G. CRAXFORD†

I PROPOSE to divide, under separate headings, the various functions of general consumer service, recapping very briefly the improvements which have taken place over the last, say, 30 years and stating what improvements I consider can be made in the foreseeable future to enable us to give an even better service.

First of all let us deal with our main fuel, gas. Since vesting day there has been a wholesale closing down of small works throughout the country. As the gas is now or soon will be manufactured in large stations, there is available a more uniform product than was ever possible before, both as regards calorific value and specific gravity. By using what we know as the Wobbe Index, which is really a combination of the two in relation to each other, we are no longer worried on the district by variations in quality or gravity, due usually to peak working or lack of modern technical control, which do not allow the appliances in the consumers' premises to give their best efficiency at all times. By the closing of small works we have virtually finished with the dreaded substance naphthalene and other unwanted chemicals, which used to cause so many choked services and sticking governors.

Distribution

Looking backwards over 30 years, distribution started at the works holder and gas passed into the trunk mains through the station governor at a pressure of two up to say four in. W.G. on to the district; this pressure was adequate for most of the time, but boosters were coming into fashion to deal with peak loads, especially on Sundays. The mains were mostly of cast iron with open lead socket joints, but in some towns high pressure mains to cater for high pressure street and shop lighting were in being. In the early thirties progressive gas engineers were realizing that greater economies could be made in manufacture if smaller works were closed down and gas making concentrated in the larger stations where mechanization could be fully developed. Thus we saw the smaller undertakings being acquired by their larger neighbours to the ultimate benefit of both undertakings and consumers.

The work of connecting these works enabled quite a number of large and small villages on the route of the mains to have a gas supply available, and a large amount of profitable new business was obtained in that way. Since vesting day this process of integration has gone ahead at a great pace, especially in the area of our Board, and this has brought about a number of new problems to the distribution engineer. First of all he has had to become a land agent overnight in order to negotiate wayleaves through fields as the high cost of modern road re-instatement, etc., has made it more than ever necessary to keep mains out of hard roads. But the chief problem is peak loading on mains and compressors and the regulating of the supply to all holder stations throughout each 24 hour period.

Fortunately, equipment is now available to enable us to control and operate these holder stations, covering a large area of supply, from one point if necessary.

It is a fact that all new housing developments take place on the perimeter of our cities and towns. Therefore our domestic load is constantly moving farther away from our works or holder stations, and as we have to follow our consumers, our local mains not only have to carry more gas but they have to carry it longer distances. This problem has been dealt with by boosting, high pressure feeders, high pressure storage at strategic points, and so on, but it is getting more expensive and more acute every year, and we are approaching the limit on our existing mains, many of which were laid over 50 years ago. With the congestion on and below the main thoroughfares of our towns, laying new and larger mains is going to be very costly, and in some places it will be virtually impossible to carry out such a project at anything approaching an economic cost.

I am certain our production colleagues can help us a great deal by producing a much higher calorific value gas; a 750 or 800 B.Th.U. gas at possibly a slightly higher gravity would increase our main carrying capacity by 50%. This would also mean our services, meters and carcassing would have increased capacity in the same proportion. I agree this may not be possible with the present plant, but I do think consideration should be given to this matter when new methods of gas making are being evolved. We are apt to forget the amount of capital we have buried in the ground and in consumers' premises. It is anything up to £50 per consumer in mains and services, approximately £6 per meter, and £7 per carcass based on today's prices. We must think of the supply system in therms per hour, not cu.ft., and as an industry we should base our economics on price per therm at the appliance, not into the holder.

Spun iron pipes with mechanical flexible joints have greatly reduced mainlaying costs, and they have been in use long enough to prove they are quite suitable for high pressure distribution up to pressures of 30 lb. per sq. in., which is the normal practice in this country. Steel pipes with welded joints are favoured by some engineers, especially for integration mains; both materials have their advantages and disadvantages and it must be left to the engineer concerned to select the material best suited for the job. In my own particular district galvanized steel barrel has been used for many years for service work, and I can truthfully say it has given every satisfaction; the number of choked services is remarkably low as internal corrosion is practically non-existent; this is also proved by examining the meters brought in from the district for repair which are virtually free from rust deposits.

The best way to illustrate the improvements that have been made in meter design and construction would be to say that 30 years ago when changing meters I used to have to carry 10 litre wet meters, complete with water, weighing about 1 cwt., up cellar steps. Compare this with the modern .05 cu.ft. per revolution meter which has a capacity practically 100% higher, and is only a fraction of the weight and bulk.

Carcassing

The best looking installation in a house is the one you cannot see—by this I do not mean that all pipes should be buried in plastered walls, but they should be concealed wherever possible or run on the 'blind' side of fitments or recesses. If pipes have to be exposed to view, let us see that the clips or brackets are evenly spaced, and the pipes kept away from the walls thus avoiding dirt and grease traps. Many consumers must be annoyed at having a nice kitchen fitted with fairly expensive equipment spoilt by unsightly plumbing or gas fitting. The gas industry is responsible for installing 90% of the gas appliances in this country, either by direct labour or contractors under their supervision, so it is our responsibility to see that business is not lost by unsightly work.

In order to ensure that internal supplies are correctly sized and planned it is necessary that plans of the premises, or the buildings if already erected, should be surveyed by a competent fittings inspector. In my opinion I would like to go further and have an inspector survey every job, except say a replacement appliance, before it is fitted.

Appliances

I think it is true to say that nothing has improved so much in our industry as appliances. Again, looking back over 30 years, the improvement in the design and construction of cookers and gas fires has been really phenomenal. Taking cookers first, the majority were of black cast iron, the ovens were single cased and the control taps were of brass. But in fairness I must say some cookers did have lagged ovens, and the outer casings and door panels were of enamel sheet —usually green, brown or white.

I believe it was in 1923 that the bottom flue outlet oven with thermostatic control made its first appearance. This was a revolutionary change and marked a new era in cooker history, and I do not think it is any credit to us that some of the older type of black cookers are still on the district.

The gas fire has also been improved, both in appearance

* From a Presidential Address to the Western Junior Gas Association, delivered at Weston-super-Mare, on April 30.

† District Manager, Taunton, (South Western Gas Board).

and efficiency, since the twenties, when the predominant colour was again black and there was an ugly looking canopy over the radiants. It will be many years before the fireplace is omitted from the homes of England, and gas fires which harmonize with the surround or are built in as an integral part of the fireplace have a great future. But I am certain that more research is needed to produce an even better fire not only in appearance, but more efficient than we have today and at a cheaper price.

In the gas-heated washboiler there has not been any really remarkable change in design except the change from a round base to a rectangular one and vitreous enamel finish instead of galvanized, although there are still plenty of the latter being made and sold.

The manufacturers of gas and electric water heaters are alive to the potential business to be obtained, and they are continually striving to improve their products. These have changed a great deal in design during the last few years and are still changing, but the greatest amount of research has been directed to the vital question of maintenance. Here, I think, is where our production colleagues could give a big hand by sulphur removal, in fact it is a vital necessity to do so immediately if we are to obtain our fair share of this ideal load.

We had to wait until the thirties for the gas refrigerator, and this is still looked upon as a luxury appliance, when in fact it is a very essential piece of equipment. The earlier refrigerators were water cooled, but they were soon superseded by the air cooled model. I am certain we are going to hear much more about refrigerators in the near future, and a more ideal appliance both as regards load factor and consumption will be very difficult to find. The potential load from this appliance is so great that it will pay the gas industry to make an all-out effort for this business; if we don't, our competitors will.

The greatest change in radiators, or to give them their correct name, convectors, is probably the superseding of the gas-steam by the hot-air type. Although I have included this piece of apparatus in domestic appliances, its chief use is in commercial premises and small halls used for meetings, etc. It is in the shops, especially where rayon goods are sold, that we are experiencing the effects of the sulphur content in gas. As the appliance is usually fitted without a flue great care must be taken to ensure that there is adequate ventilation available before installation. I am aware that there are types of convectors on the market with a balanced flue, but these have to be fitted on outside walls which are not always available.

Maintenance of Appliances

I often wonder if maintenance is the right word to use for what is really an 'after sales service.' Does not the word 'maintenance' convey to consumers that gas appliances have to receive frequent visits from a fittter in order to make them work, whereas the truth is they only require perhaps a minor adjustment or attention in order to ensure they are giving satisfactory service to the consumer?

There are those who think request maintenance fills the bill; others, and I am one, consider regular periodic maintenance is the best solution. Some, in the good old English idea of compromise, say they agree with the latter but 'we cannot afford it.' I say we cannot afford to omit this valuable item of goodwill and commonsense business, especially if the attendants are given some sales experience. We have for many years been giving this question quite a lot of thought and have carried out many improvements in fittings practice and appliances in order to achieve greater safety to our consumers, but as we know there are many thousands of appliances and installations which fall very short of what is now recognized as a standard of safety. It is here that the 'maintenance man' can give us and the consumer very valuable information on this very essential part of our service to the general public, and this should always have the highest priority, more especially in households in which there are elderly people or young children.

Now to come to the real reasons for the necessity for this maintenance. There are really three main causes, and in my opinion they are in the following order: Sulphur in the gas, maladjustment of appliances, and grease or dirt, especially in aerated burners. Taking the last first, we are gradually getting away from the aerated burner, especially in gas fires where carpet fluff has always been very troublesome; and the modern cooker is so easy to keep clean that grease troubles on injectors are fewer than with the old black cooker. Maladjustment of appliances has been reduced considerably by the fitting of governors, fixed injectors, etc., and by having a more consistent calorific value gas. Last, but by no means least, sulphur, the nightmare of all who sell and install gas water heaters and flueless space heaters. So much has been said but so little has been done to remove sulphur from the gas, and I think the industry is behaving like an ostrich in this vital matter. I know it will cost a lot of money to carry out this essential work—but so does appliance maintenance. We are losing valuable business, in fact we are handing this business to our competitors on a plate.

Appliance Sales

There is no more important function of general consumer service than selling appliances. I have seen many methods in operation; each in its own way has been good in certain circumstances. In my opinion the first consideration must be locality, before deciding what method to adopt—*i.e.*, general canvass, concentrated canvass or 'sales blitz,' sales letters, special advertising, etc. I personally think the continual canvass brings in the best long term business, but I also consider it is very necessary to have periodic 'sales boosts' and concentrate on, say, 'seasonal sales.'

One could argue for hours over the question of showrooms. Should they be designed for prestige or utility? Here again locality is the main consideration; what would be ideal for one town would be hopeless in another. A very important point is that all showrooms must have direct contact with the fittings office and be able to give a definite answer to the consumer who requires to know a date and time when the work he requires to be done will be carried out. Showroom personnel should never make a promise without first making certain that the promise can and will be fulfilled by the responsible people, and it should always be borne in mind that promises must always be kept. Consumers, like children, never forgive a broken promise. One more point, I do not agree to undue priority or preference being given to cash as against hire purchase or simple hire; we all like the cash customer and he is the best one for the industry as far as the appliance sale is concerned, but cash appliances do not use more gas than those bought on hire purchase or hire terms.

Nationalisation, on account of public accountability, has made it more than ever necessary that our accountancy system must be administered by specialists. I know many of my colleagues have said some hard things about the 'red tape' and 'interference of accountants.' I have done so myself, but we do know how helpful they can be in watching our costs and keeping us on the right side of the ledger. How many businessmen have found themselves in 'Carey Street' through not having this information available to them at the right time? Probably one of the chief causes of irritation, if that is the right word, which exists between the technical and accountancy staff, is the paper work which is asked for by the latter, often at the most awkward moments. No doubt the question may be important in the mind of the questioner, but to the technical man with a mechanical breakdown on the works or a fractured main on the district it is a distraction and I am certain that our accountancy friends will surely agree that the primary duty of the production and consumer service staff is to supply gas and service to the consumer.

Coke

I am certain that with the advent of a Government Clean Air Bill we shall see the selling of coke, especially to the domestic consumer, run by a separate department. I always think of coke as the substance of which we either have too much or too little according to the whim of the weather clerk. I suppose this will always be so until builders are educated to provide more fuel storage space than they have done in recent years and the public realize that cold snaps come suddenly. The industry, I know, is fully alive to the potential market for coke when the Bill becomes operative, and I expect the technicians will do everything possible to provide as good a product for the solid fuel market as they have done in the gaseous one.

The main purpose for which coke is used by domestic consumers is to heat water in an independent boiler, and it is ideally suited for this work, providing it is the correct size. I am sorry to say, however, that the consumer does not always

get the correct grade. Quite an appreciable amount of domestic coke is sold through merchants, so we do not have the opportunity of seeing that the consumer is supplied with the right size for the job; neither do we hear all the complaints which go to the merchants who may take the line of least resistance and advise the consumer to change to another fuel which they sell. Direct selling would give us greater control and enable us to give a better consumer service.

Many thousands of continuous burning grates have been fitted during the past few years. How many are burning coke? I believe the percentage is extremely low, and I personally think we have lost a great chance of getting in on the ground floor, but with the Clean Air Bill we shall have another chance to capture this valuable business. We must produce a coke of the right size and quality for the purpose, and we must also be prepared to supply our product in small quantities with regular delivery to our consumers, who very often have neither sufficient storage space nor the money to purchase coke in lots of five cwt. or over.

The largest potential consumers of domestic coke are the same as the largest domestic users of gas, namely, the weekly wage earners. We give them facilities to purchase gas weekly by means of prepayment meters. Surely we should enable them to purchase coke weekly or at least fortnightly. I have proved this service is greatly appreciated, especially by consumers on housing estates.

Personnel Management

In recent years personnel departments have become a feature in the gas industry. The personnel manager and his staff have a very important duty to perform in seeing that salaries, wages and conditions of employment are kept as uniform as possible throughout the industry. Here again, experts wh have studied the intricacies of industrial relations, which in cludes welfare and social work, are of great value. Good pe sonal relationships between management and workers is ver essential to the success of any business, and I consider tha the success of our industry in the past is due in no sma measure to the fact that our personal relations have bee very good. Gas employees have always been treated perhap not any too generously, but certainly very fairly. Peopl nowadays do not have to work for any particular firm or in dustry, so if an industry does not pay a man his worth the cannot blame anyone if they lose him. On the other hand if a man is not satisfied with his present job, I know of n law to prevent him trying to get a better one, and I hav no patience with any person who accepts employment, afte having been told of the conditions, who agitates at some late date for some financial recompense for any so-called hardshi which these conditions may bring.

The Future

What of the future? I can see no reason for any pessimism at all, in fact I do not see why we should not enjoy continued prosperity for many years to come, but we can only achieve this by having confidence in our products, and what is more important, confidence in ourselves. I know we have powerful competitors, especially electricity, but electricity is not something new, they have been chasing us for years. Let us see they are always chasing us by keeping ourselves in the lead, especially in the domestic field. Why not use electricity more to our advantage? We are using it to operate agitators and wringers on washing machines; why not use it to light our cookers or ventilate our water heaters, etc.?

Nuclear Development in the Commonwealth

ON June 16 Sir Anthony Eden gave the House of Commons an assurance that an up-to-date account of the British Commonwealth contribution to nuclear research would be available to the public, at home and abroad, in time for the International Conference on the 'Peaceful Uses of Atomic Energy' at Geneva, opening on August 8. In fulfilment of this promise the Stationery Office has published a 52 page booklet, prepared by the Central Office of Information, entitled 'The Commonwealth and Nuclear Development,' price 2s. Within its pages is told, in non-technical language, an exciting story of 55 years of pioneering work in a new field of scientific endeavour.

From the day in 1903 when Rutherford and Soddy first suggested that the disintegration of atoms might be associated with huge releases of energy, British scientists have been in the forefront of the experiments which have clarified atomic theory. Fission by artificial means was accomplished by Cockcroft and Walton at Cambridge in 1932, and steady progress was made until the outbreak of war, when work on nuclear fission for military purposes was intensified. A team of British physicists under Chadwick contributed materially to the success of the atomic bomb development in the United States.

In 1946 Britain was able to concentrate once more on the peaceful applications of atomic energy, and the construction of nuclear reactors whose uses are wholly beneficial to mankind. As research tools they help to speed up the progress of science and technology; they create a host of new substances, mostly radioactive, which are proving of the greatest value in research, medicine, industry and agriculture; and they will soon be used in atomic power plants which will make available to the world vast new sources of energy by using fissile material as fuel. Such fuel is highly concentrated and easily transportable to countries remote from coal and oil supplies and lacking sources of water power.

Four experimental nuclear reactors (with the intriguing names of Gleep, Bepo, Zephyr and Dimple), are in operation at Harwell, and Bepo together with the Radiochemical Centre at Amersham, is producing radio-isotopes in perfect safety and at reasonable prices. Britain is the world's largest exporter of radio-isotopes; in 1954 the total number of shipments—7,252, was greater than that of all other countries combined. Their use is also expanding rapidly in Britain as industrialists realize that their possibilities in research and control are limitless. They can be used to check the quality of castings, to counter static electricity in paper-making and textile processes, to trace the flow of liquids and gases, to spot leaks from supply systems, to check the evenness of mixing and the thickness of oil films, to measure filter efficiency, to trace mud movement in estuaries, and to make possible the measurement of wear in metal bearings. An isotope in a spigot about one inch in length is capable of replacing a costly million volt X-ray plant.

Britain also leads the world in the race for the production of electricity from nuclear energy. The world's first large-scale experimental nuclear power station at Calder Hall, in Cumberland, is expected to come into operation in 1956, and will be capable of generating 50,000 kW.—enough to supply a medium-sized town. It will be followed by a full-scale breeder reactor at Dounreay, in Caithness, 12 nuclear power stations throughout the country which are scheduled for completion between 1957 and 1965, and six new reactors at Calder Hall and Annan which will make a useful contribution to the public electricity supply within the next five years.

Britain helps other countries with their research and development programmes, and trains their scientists and engineers at Harwell, so that eventually she should be able to export entire nuclear power stations to a world hungry for energy. A whole new industry has grown up around these projects. More than 150 British firms have either undertaken work for the United Kingdom Atomic Energy Authority or are manufacturing nuclear instruments, and the creation of the existing research and production plants has involved a number of well-known civil engineering firms.

The booklet also describes Canada's atomic energy project and the progress which has been made in other Commonwealth countries, whose most significant contributions so far are their actual and potential supplies of uranium and other materials needed for nuclear development. It concludes with a chapter on international co-operation, which Britain has taken active steps to foster. Harwell took the initiative in 1951 and 1954 by holding two international conferences devoted to the peaceful uses of atomic energy, and their success paved the way for the recent conference at which more than 50 nations were represented.

Planning for Thermal Efficiency*

By K. H. H. LANGFORD, Assoc.M.Inst.Gas E.†

OF all the technical facilities offered by the fuel industries for the promotion of fuel efficiency, the gas industry extends an unequalled advisory service through the resources of the Industrial Gas Development Committee, the industrial gas development centres, and the industrial gas engineer. The Wales Gas Board has been conscious of the practical need of such an advisory service and has established at Cardiff an industrial gas development centre, with subsidiary centres at Swansea and Wrexham. Existing gas equipment is inspected and tested, and advice given on the best means of obtaining competent operation at the lowest fuel cost. Technical information is granted in respect of any new heat requirement, or on the conversion of existing plant to gas firing. One of the many other purposes of the industrial gas development centre is to carry out periodic examination of installed gas equipment with a view to maintaining efficient operation.

Development of Combustion

Combustion may be defined as a chemical reaction between the combustible elements in a fuel and the enveloping medium of air. Town gas has been best described as a mechanical mixture of combustible gases, each in its own relative proportions, and each gas having its own individual inflammability limit. In addition to these gases, there are the incombustibles so that it is obvious that if any appreciable quantities of these inerts are allowed to remain in town gas, then their presence will tend to reduce the temperature of the flame. The proportionate ratio of air to gas to emit the desired heat is dependent upon the type of flame to be used, whether it is pre-aerated, aerated or post-aerated, whether it is intended to produce a high rate of heat exchange in a small interval of time, or to employ the application of a low heat over a very long period of time. But whatever combustion system is decided on, any retardation in the passage of air will result in the non-establishment of the complete chemical reaction which forms the flame, so that an interrupted heat transmission is effected and thermal efficiency lowered.

Post-aerated Flames

The simplest form of burner is that of the post-aerated flame in which the product of combustion is arrived at in one single stage, all the air required being supplied as secondary air. The burner jet is usually designed to produce the familiar fan-shaped flat flame. This type of flame has the advantage of being easily controlled, as it remains stable over the complete range of turn-down, so that by reason of its soundness it represents its usefulness for a wide variety of processes, such as the firing of central heating boilers, air and infra-red heating, bakers' ovens and other oven groups used for many drying operations of industry. A post-aerated flame should never be impaired by chilling, or by causing it to be in contact with a cold surface. Chemical dissociation will take place as a result of a direct change in temperature, with the precipitation of solid carbon as free soot.

The jet can be made of steatite, producing orifices with perfectly smooth internal surfaces to give uniformity of flame, or the jet may be constructed from heat and corrosion resisting stainless steel. A cluster of jets when mounted on a manifold must be so arranged that each individual flame receives sufficient air, and the pitch is such to ensure ignition of all the jets from one flame, but they must not be allowed to be absorbed by one another, or substantial diminution in heating value will result. This type of burner is usually used in appliances operating under natural draught by which the incoming air assists in keeping the jets cool. The gas rates through different sized single jets can be representative of a wide range from 1 cu.ft. per hour or less, to large post-aerated burners of 3,000 cu.ft. per hour, at a gas pressure of 1 in. W.G. The burner is invaluable where large quantities of gas have to be burned in a minimum of space.

Aerated Flames

The aerated flame system is one in which the gas entrains an admittance of primary air before the burner ports, and the low pressure atmospheric bunsen burner is a good example of this type of flame and is extensively used under conditions of natural draught to cover a wide range of applications, being particularly adaptable for appliances that demand concentrated and well distributed heat—*e.g.*, space heaters, industrial ovens, pans, vats, soft metal melting pots and general furnaces.

A well-shaped flame of the most practical usefulness is indicated by the slope/height ratio. This is the relationship formed between the burner port diameter in association with the actual length of the side of the cone, and a ratio of four times the burner port diameter produces a high degree of efficiency. A soft flame would have a high slope ratio, and the sharper the flame the lower the slope ratio becomes; if less than two and a half times the port diameter the danger of strike-back is identified. In both cases the same evolution of heat is obtainable, provided that the gas rate is kept identical, but the shorter flame is at a higher temperature.

In order that the flame shall remain stable, there must be a relationship between the proportion of air and gas. With reduction in the supply of gas or increase in the passage of primary air, the shape of the flame becomes smaller, the air/gas mixture becomes more explosive until a point is reached when the velocity of the speed of flame is greater than the efflux of the gas/air mixture, so that the flame passes through the burner port and combustion takes place within the tube, overheating the burner to the detriment of complete combustion.

Pre-aerated Flames

Pre-aeration produces a short intense flame, differing from the aerated flame in which air is introduced by the gas stream, by employing air supplied under pressure usually at about 1 lb. per sq. in., through the medium of a motor-driven fan, the pressurized air jet entraining the gas for combustion. The proportionate supply of gas to air can be maintained by the employment of a specially designed atmospheric gas governor to supply gas to the throttle at atmospheric pressure, so that the flow of gas in the air/gas mixture will remain constant for any varying pressure at which air is supplied to the injector. Such an arrangement ensures the stability of the flame over the turn down range and thereby simplifies temperature control. Another method for proportioning the air/gas mixture is one in which the air and gas are mechanically mixed to the correct ratio by the use of a mixing machine that is automatic in its operation to ensure perfect combustion conditions. With this system the diffused mixture is supplied at about 3 lb. per sq. in. to the burner ports, through one single pipe line.

Gas and pressure air burners are widely used for the firing of furnaces, and normally discharge into refractory tunnels which act as ignition zones and rapidly attain a state of incandescence, stabilize combustion, and produce a stream of combustion products at high temperature to be used to reduce the size of the working space of the furnace. Specially designed furnaces employing this technique for the heating of bars, plates, flats, etc., are virtually heated slots to evolve maximum efficiency.

Application of Heat

An excellent example of conduction is the central heating or hot water boiler, where heat passes through the metal of the boiler, and through the boiler sections to the contained water. The variable degree of conduction through materials

* From a paper presented to a meeting of the Wales and Monmouthshire Junior Gas Association at Swansea, earlier this year.

† Assistant Industrial Gas Engineer (North Wales) Wales Gas Board.

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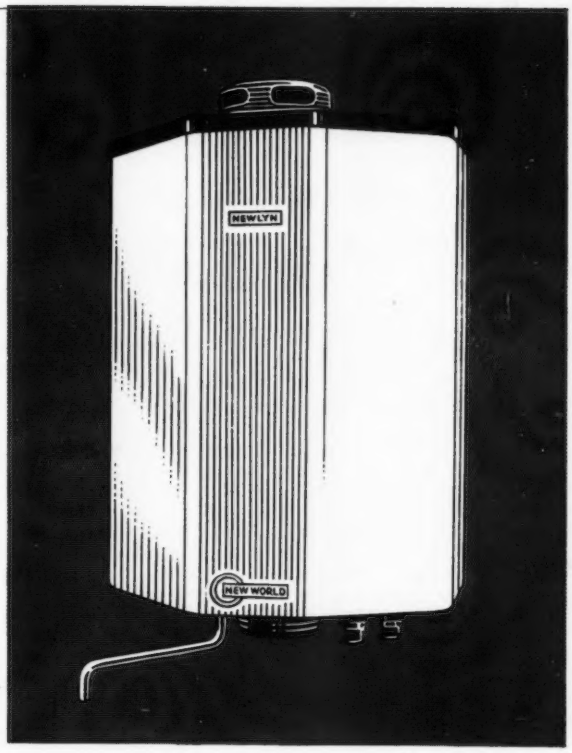

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No alteration to the meter service, no peak load problem and nothing further to worry about . . . **Minimum Servicing.**

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is important and the choice of material to be employed in the design of gas equipment can promote or hinder efficiency. Metals of high thermal conductivity are copper and its alloys, aluminium and its alloys, and thermal conductivity is lowered by the use of iron and steel.

Heat transmission by natural convection is due to current movement in liquids or gases; bodies or particles are made to move by the application of heat and carry their heat with them. The amount is dependent on the temperature differences and on the presence of any obstruction which may baffle or divert the currents of convection. Examples of applicable convection heating are the movement of hot water throughout a circulating system, or the use of air movement for space heating.

The cooling effect of a passage of cold air is by convection, so to make the best use of convected heat to warm a room air changes must be reduced to a comfortable minimum, or the efficiency of the installed appliances will be low, and a greater application of heat would be necessary to restore personal comfort.

Forced Convection Heating

Forced convection heating by direct or indirect gas firing can be advantageous where high thermal efficiency and close control is required, with the avoidance of overheating. Examples are the heat treatment of light alloys, where the operative temperature requirements are critical and the maximum advantage to be gained is complete uniformity of heating. Other uses are for the drying of moisture from saturated chemical material, core and mould drying for foundry work, and the drying of carpets after cleaning.

The heating unit generally consists of a refractory-lined combustion chamber, sometimes incorporating re-circulation of the heated air in which the gas burners are positioned. Forced air convection is produced by arranging for the combustion chamber outlet to enter a hot gas fan. The fan draws in the heated air and then forces this air to where it is required. In all these instances, the appliance should be automatically controlled with the added protection of a flame failure device.

Radiation is usually associated with the study of convection. If the maximum use of radiant heat is combined with a good convective movement then their incorporation will usually lead to a highly efficient form of heating. Controlled radiant diffusion flame burners are in common use for the conversion of solid fuel fired central heating boilers, steam tube and hot air bakery ovens, dryers of all description, and for many other purposes. Essentially, the burner comprises a refractory firing block through which post-aerated flames are projected, radiant diffusion flames are propagated, increasing the proportion of heat transferred by flame radiation. The entrainment of air is dependent on natural draught. These burners can be arranged for fully automatic control, controlling combustion air volumes, complete with flame failure and safety lighting devices.

The function of the flue is to maintain the discharge of the products of combustion to the atmosphere and to provide ventilation of the room in which equipment is situated, to prevent downdraught, and to minimize heat loss. The draught diverter must be correctly positioned, as on this component depends the maintenance of thermal efficiency. The diverter should be one of established design and always fitted following the primary flue at a distance of about 12 in. from the top of the appliance. It must not restrict the evacuation of the products of combustion nor must it allow any down-draught to enter the zone of combustion so adversely retarding the process of flame formation. In designing a flue-way, consideration must be given to the problem of removing the high proportion of water vapour, resultant from the combustion of town gas, and here perhaps the greatest difficulty to be encountered is the avoidance of condensation.

With a high thermal efficiency within the appliance, the waste gases are at a relatively low temperature, and if these gases while still in a flue are cooled to a temperature below that of a dew point, condensation will occur and the condensate will chemically attack the component parts of flue. Condensation can be overcome by providing an adequate dilution of the waste gases by the admittance of excess air and the prevention of excessive cooling. Preferably a separate and individual flue should be utilized for a gas appliance, but if an existing chimney has to be used it should be swept and precautions taken to ensure that the chimney is of ample area.

Control Devices

A governor should be an indispensible feature of every ga burning appliance. Gas pressure variations are usually th result of changes in district pressure; pressure loss is alsc produced by a varying number of appliances in use at an one time, so that it is advisable that a separate governor shoulc be fitted to each unit of equipment.

Where thermostats are to be provided in an installatio their location should be carefully chosen. The consume should receive careful instruction as to their correct opera tional use as any misunderstanding can lead to a complet breakdown of thermal efficiency. The ordinary room thermo stat needs careful positioning. The degree of useful servic that it is expected to perform is sometimes nullified by allow ing the thermostat to be exposed to stray air currents, or i the path of some form of direct heat radiation. Protective measures should also be taken against the liability of acci dental movement of the setting.

Fuel savings can be made by giving guidance to the con sumer on the most practical times of lighting up and shutting down an appliance. The most effective achievement of this purpose is by the provision, whenever practicable, of a clock controller to give automatic timing. Gas heated industrial equipment should be safeguarded to ensure that gas cannot pass to a burner until a pilot light is established close enough to the burner to ignite the gas, and to ensure that if for any reason the flame is extinguished, then the gas supply is automatically stopped. Three types of automatic pilots are in general use, the thermal expansion type, the thermocouple, and the flame electrode type. There should be a minimum of delay in the automatic shutdown of the gas control valve if the pilot flame is extinguished. The thermal expansion type is not so rapid in action as the thermocouple or the flame electrode; therefore it is important that it should be installed so that if flame failure has occurred it will cool quickly.

A low pressure cut-off valve is a further safety device that should be used in association with the automatic pilot, either as a separate component or incorporated as a part of the automatic pilot system. The device provides against the possibility of unlit gas entering the appliance, due to a fall in pressure or an unnoticed interruption of gas supply. It is also a safeguard against the liability of explosion due to burner cocks having been left open when the main cock has been closed, so that if the latter valve is turned on gas cannot pass into the appliance.

The cut-off valve is so arranged that once the valve has shut it will not re-open of its own accord, even if the pressure on the inlet side has been re-established. To obtain the passage of gas the burner cocks have to be closed, and a press button mechanism incorporated in the cut-off valve must be reset.

An Interesting Heating Application

An interesting problem arose in designing the heating of a small animal house accommodating colonies with commensurate breeding stocks of small mammals which are kept for research work in medicine. One of the main conditions in the design of this particular installation was to ensure constant temperature and adequate ventilation at all seasons. The building is of brick cavity walls, rendered outside, with corrugated asbestos sheet roof with timber supports, and it has been divided up to give 10 rooms, including a two-storey block 28 ft. by 16 ft. containing a sterilizing room and stores. A laboratory and operating theatre is adjacent to the animal room, each being 15 ft. deep. The smallest, assigned to mice, is 7 ft. wide, and all other animal rooms are 10 ft. wide. A corridor runs along one side of the building. Insulation of the roof, without harbourage to pests, was a difficult point. The expedient adopted was to line the inside of the roof with a $\frac{1}{2}$ in. layer of pressed asbestos, since this would leave no cavity, and then two coats of silicate paint was applied to give a waterproof non-condensing surface. No windows are fitted but the rooms are lighted by Perspex roof lights on the north west side. This gives high light intensity, which can easily be diminished if required. Smaller glazed areas are required than for normal windows, making for heat conservation. The walls have a waterproof finish, free from crevices,

and withstand hard scrubbing and the action of chemical disinfectants. Floors are of asphalt laid over concrete, with covered skirts. A trapped gully is provided in each animal room with a water tap above.

It was initially specified that the heating in the animal rooms should be for a maximum temperature of 70°F. with four changes of air per hour, when the outside temperature was 30°F. For summer ventilation, provision of up to six changes per hour was needed. The risk of down draughts which would be serious with animals in open top cages was dispelled by careful siting of the heating and ventilation arrangements. After consideration had been given to various methods of applying the required heat to ensure constant temperature, the expedient chosen was a hot water central heating installation fired by a fully automatic boiler rated at 280,000 B.Th.U. per hour. The boiler house is separated from the remainder of the building, and the products of combustion discharge well away from it so that there is no danger of the waste gases reaching the animals.

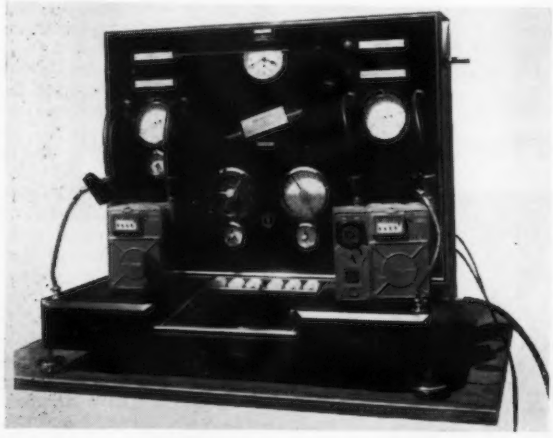
The circulation of hot water is completed with the aid of an electrically-powered accelerator. As a standby, a petrol driven pump is used in the event of a power breakdown. Hot water radiators fitted with baffle plates are set in front of cold air intakes to warm the air as it enters the rooms. Each radiator is provided with a motorized butterfly valve for applying automatic temperature control in conjunction with an accelerated room thermostat. The thermostat is set centrally on the wall of a room, at a height close enough to the occupants. This increases the heat sensitivity which maintains the radiator at an equable temperature, so that a steady room temperature and reasonably constant convected heat and radiant heat conditions are maintained. All circulating pipes within the rooms are left unlagged.

Variable speed motorized air extractor fans are built into the outer walls of the animal rooms, at a height of about 7 ft. All extractor ducting and air intakes are provided with metal grilles to prevent the possible entrance of undesirable pests. Louvred registers are set over the air intakes, so that in severe weather the amount of air entering the rooms can be reduced by the regulation of a hand-operated quadrant.

Mobile Meter Testing Panel

THE Sales and Service Department of the North Western Gas Board is now using a new type meter testing panel to facilitate the speed of testing and subsequent disposal of meters returned from the district. This panel was designed by Mr. W. Mottram, now Sales and Service Officer to the Board's Mid-Cheshire Group, and a prototype was assembled for experimental and operational use. Finally, Parkinson & Cowan Industrial Products were invited to manufacture and market the equipment. Further development by the manufacturers, in consultation with the designer, has resulted in the production of a number of panels for use in the area of the North Western Gas Board.

The apparatus is intended for the testing of all sizes of domestic meters. Air at governed pressure is provided by a small blower unit, which can be operated either by an electric motor off the mains if the panel is being used at a depôt, or



The mobile meter testing panel in operation

from batteries via a rotary convertor if the panel is, as sometimes, mounted on a truck. Special dry test meters with two large rotating dials indicate the percentage of error of the meter under test; this is a direct reading register, no calculations being necessary.

The test meters fitted with readily detachable tops can be regularly checked for accuracy and quick adjustment made if necessary. As the dial rotates and the pointer, used to reset to zero, is a friction fit in the glass, no strain is applied to the test meter parts in the resetting operation. Two rates of flow are possible with this panel. A dummy dial obviates the necessity for running the meter to zero position before the commencement of test, the dummy dial pointer being a reminder of the starting position of the test dial pointer. All solenoid valves, lights and starting gear are electrically operated. An inclined tube manometer, designed to avoid the accidental blow out of fluid, indicates pressure absorption and oscillation of the meter under test. Large and sensitive dry type gauges are used for soundness tests and observation of the stop valve closing.

Provision is made for checking coin meters which have been reported suspect in their performance in respect of cash prepaid and gas consumption. This is a standard cash and index check which can take place simultaneously with the registration test of another meter. By a series of differing coloured lights one can readily distinguish that the power is switched on or determine the particular test in progress.

In connection with the cash and index test, once the requisite volume has been prepaid, the indicator light for this test does not re-appear until the stop valve is closed and the test completed.

The whole panel is illuminated and individual adjustable lights are fitted to enable the shadow of the index pointer to be read in the registration test, thus avoiding the possibility of parallax. The table of the panel has two drawers and a writing desk to hold books for recording test results. The whole unit is finished in black and chrome with maroon set plastic beading surround, and measures 3 ft. 9 in. high by 4 ft. 6 in. wide by 2 ft. 6 in. deep. By this method of testing 80 or more meters can be examined in the course of the day by one operator.

The North Western Gas Board has applied for a patent to cover the panel and has agreed that the manufacturers, Parkinson & Cowan Industrial Products, shall offer it for sale to other gas boards.

FUEL EDUCATION

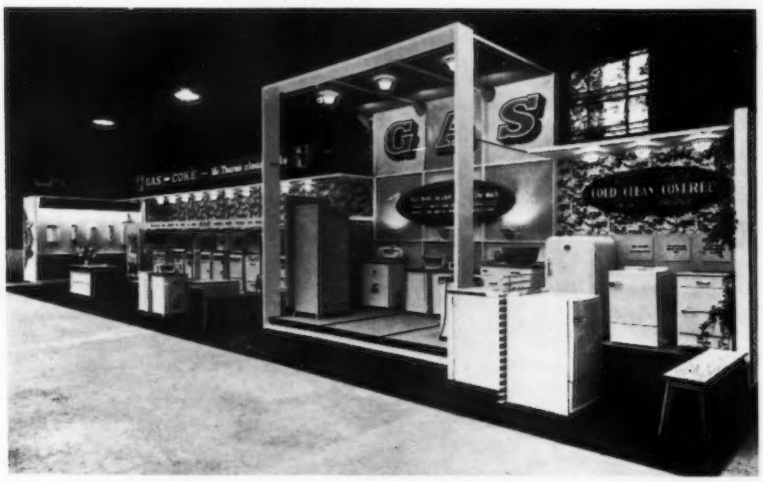
A list of City and Guilds of London Institute and other part-time courses in fuel subjects offered at the polytechnics and other technical colleges in London and the home counties for the session 1955-56 has been compiled by the Regional Advisory Council from information supplied by the colleges. The courses include boiler house practice, combustion engineering, steam utilization practice and technology, fuel technology, technology of gas manufacture and supply, solid fuel production, distribution and utilization, and a course for smoke inspectors. It is pointed out that the courses can only be held if a sufficient number of students applies to enrol. Several colleges have decided this year not to offer certain courses because they have been poorly supported by industry and as insufficient students have come to enrol. Copies of the list may be obtained on request from the Secretary, Regional Advisory Council for Higher Technological Education, Tavistock House South, Tavistock Square, London, W.C.1.

NORTH THAMES JUVENILES IN CAMP

For the third year running, the annual camp organized by the North Thames Gas Board for its juvenile employees was held at the Isle of Thorns in Ashdown Forest. Seventy-five employees took advantage of this opportunity to spend a week's camping holiday at a nominal cost, at this well-equipped permanent camp—a 100 acre site administered by the Manor Charitable Trust. The camp includes an open-air swimming pool, tennis courts, football and cricket pitches and a nine-hole golf course. Organized by the Board's Sports Association, the camp was instituted many years ago by the former Gas Light and Coke Company. Transport is provided, various entertainments are laid on, and this year outings were organized to Eastbourne and to Brighton. Boys were under the care of a number of camp officers, all members of the North Thames Board's staff, especially chosen for their experience. Visitors to this year's camp included Mr. Brian Wood (Secretary), Dr. W. Gunn (Chief Medical Officer), and Mr. R. N. Le Fevre (Training and Education Officer).

A cheery gathering of the camp officers

NOTTINGHAM IDEAL HOME EXHIBITION



The East Midlands Gas Board's stand at the Nottingham Ideal Home Exhibition created considerable interest. As the period of the show coincided with the Board's 14 days free-trial offer for refrigerators, a complete section was given over to refrigeration.

Doing a Voluntary Job

The South West District Committee of the Scottish Gas Consultative Council met at Rothesay for the first time on August 3. At a lunch before the meeting, Bailie S. Leitch, Glasgow, Deputy Chairman of the Council, said 'We are breaking new ground today. Though the existence of the Scottish Gas Consultative Council and the District Committees associated with it goes back to 1949, this is actually the first occasion on which we have set foot in Rothesay. We are a body of men and women interested in public service doing a voluntary job. When the gas industry was nationalised, the Minister set up the Scottish Gas Consultative Council, which was to look after the interests of the consumers. And one of the developments of that Council was the further setting up of District Committees, of which there are five in Scotland, composed largely of men and women who are not members of the Council but including in them four or five members who are attached to that Council.'

Since they had been set up they had served a useful purpose in placing before the Consultative Council the complaints of consumers. It was not claimed that the gas industry was perfect. The one reason why they were there was to see that everything possible was done towards improving gas service wherever improvement was necessary. Even members of the Gas Board itself would not claim that the organization was completely foolproof.

Many people did not realize that these facilities had been provided for the consumer, and they complained that there was not the liaison that there should be between the gas industry and the consumer when, in fact, it already existed.

Ex-Provost Thomas Bell, O.B.E., J.P., of Dumfries, who presided in the absence of Sir Robert Nimmo, Chairman of the Consultative Council, welcomed the members and guests.

That the question of price 'is one of our biggest bugbears at the moment' was stated by Mr. C. Murdoch, a member of the Scottish Gas Board. 'Twelve months ago the financial situation was rather doleful. We had then to admit that we had made a considerable loss, to add to our losses of the two or three preceding years. But, by the end of 1955, we should have a considerable balance in hand. We must not, however, delude ourselves into thinking that the profit which we have managed to make this year will do anything more than help to wipe out previous deficits. Increased coal, wages, and transport costs must be met. Even before we knew what the increase in coal was going to be, we started this year knowing that, by some means or other, we had to find an additional £500,000 to clear certain other increases which had come along.'

Mr. A. Jamieson, Scottish Gas Board Group Manager, remarked that 'exactly 28 years ago this month I was beaten for the gas managership of Rothesay.' He also paid tribute to Mr. Robert McFie's able management at Rothesay. Mr. A. T. Herd, secretary of the Board, was one of the guests.

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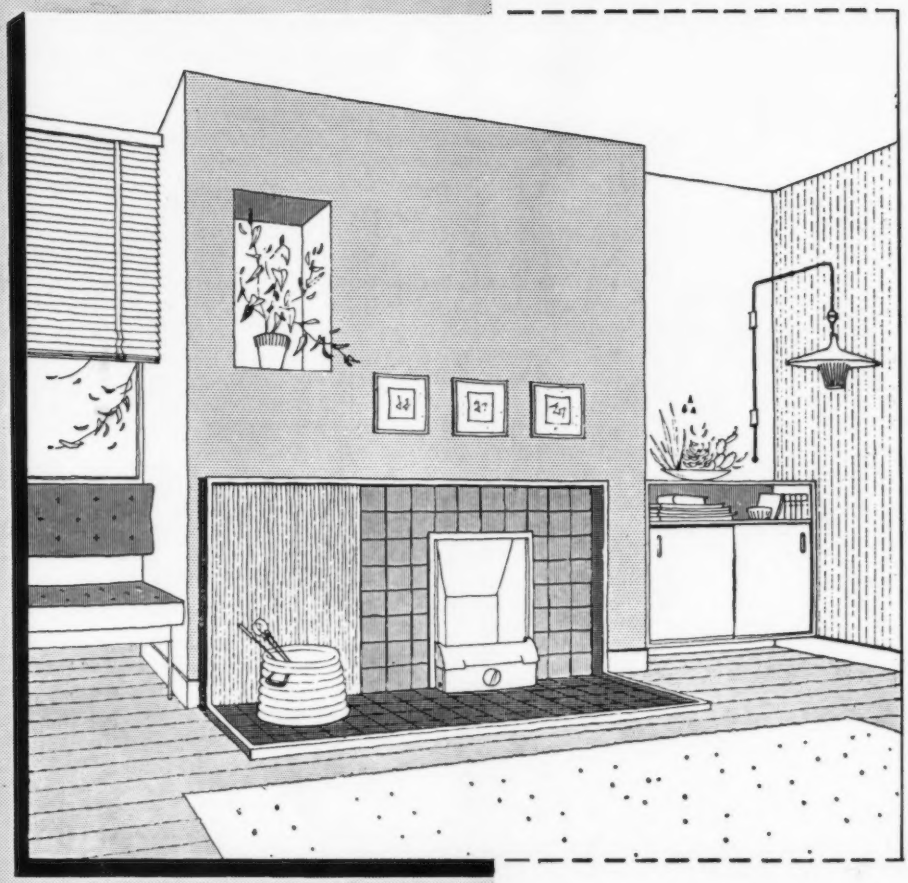
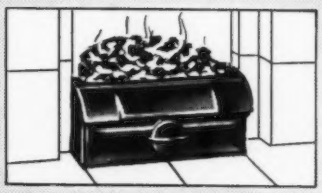
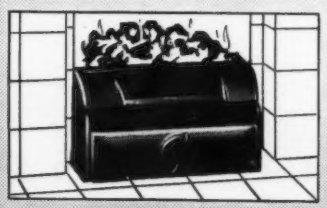
No. 25 LOWBURN

a continuous-burning gas ignited fire which thrives on COKE





Standard



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Built-in gas ignition burner available left or right hand or concealed supply.

The standard extension piece looks elegant during the day and, at night, when in raised position for overnight burning, it acts as a safety device by preventing live fuel from falling out on to the floor.

The alternative extension piece, which can be supplied instead of the standard fitment, serves as a useful trivet during the day.

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. . . . . are created by public acclaim. Cinema audiences acclaim delightful Virginia McKenna, who features in the currently released film "The Ship that Died of Shame"—and housewives acclaim the Century Cooker, which features in thousands of modern kitchens throughout the British Isles.

The roles of these two stars in contemporary life are in widely differing fields, but the pre-eminence of both is the result of their fulfilling the exacting demands of their respective roles.

VIRGINIA McKENNA appears in the role of Helen, lovely screen wife of GEORGE BAKER and only girl in the Michael Balcon—Ealing Studios "THE SHIP THAT DIED OF SHAME", produced and directed by Michael Relph and Basil Dearden.

Star features of the CENTURY

- ★ Vitreous enamelled surfaces throughout —cream exterior
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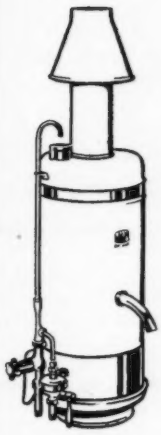


A.V...

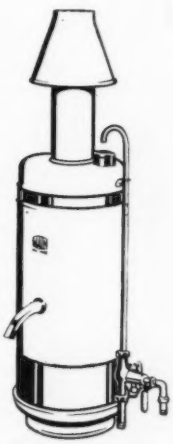
with automatic valve

This heater has an output of 2⅛ gallons per minute raised 40°F. It is finished in white vitreous enamel with chromium-plated base and fittings. The Automatic Valve ensures that the gas is automatically cut off to the burner if the flow of water fails.

or I.C.

with interlocking gas and water cocks

The interlocking cocks prevent the gas being lighted before the water is turned on; it is equally impossible to turn off the water until the gas has been extinguished at the main burner. Output and finish as for the A.V. model (above).



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LONDON OFFICE : 70, VICTORIA STREET, S.W.1. 'Phone : Victoria 5842.

Greenock Relic Disappears

A relic of Greenock's early gas history is to disappear. It is one of the town's first gasholder tanks and lies below the ground under the shops and tenements of West Blackhall Street. Only a few people have ever seen it, or even know about it. The tank, which measures 72 ft. in diameter by 18 ft. in depth, was the biggest gasholder at the early gasworks (closed more than 80 years ago), but it came into its own again for a short time during the 1939 war when it was used for emergency water storage. At present the holder is covered over by the timber flooring of premises, but a firm which has bought the building at 106, West Blackhall Street, is planning to floor it over with concrete, supported by piles rising from the floor.

The first gasworks built at Greenock was erected in 1827. The demand rapidly increased and the works had continually to be extended until 1873 when there was no further room for expansion and the present works at Inchgreen was opened, and the old works closed. By that time there were five gasholders in use at the original works, the big one with a capacity of 77,000 cu.ft., and four small ones each with 15,000 cu.ft. capacity. Two of the smaller ones early disappeared, but the others were not in anyone's way and were covered over and almost forgotten. One of the small holders is believed to exist somewhere among the foundations of the West Blackhall Street buildings.

When A.R.P. plans were being made at the outbreak of the war the big tank was remembered and, with a capacity of 500,000 gals. of water it made an excellent storage tank for emergency water supplies. A gangway was built over it to give access and pipes were led out from it to various points in the area.

Coal Information Centre

To serve the Counties of Devon and Cornwall the Coal Utilization Council has acquired premises adjoining the Royal Cinema at Plymouth as an information centre. Trained staff will be available to give free and impartial advice affecting domestic heating to members of the public, the building trade, and professional men. A temporary display of modern approved solid fuel appliances has been arranged at the centre, and this will be changed weekly until the centre is formally opened in October. When fully operative it will have on display on the ground and first floors a comprehensive selection of modern approved solid fuel appliances for domestic purposes. On the first floor space is also available for cookery demonstrations, for which a solid fuel cooker will be in operation. In addition there will be available for demonstration a central heating boiler, a modern convector fire, and a free-standing openable heating stove. Appliances in sectional brickwork will indicate to members of the building trade the correct methods of fixing.

Mr. H. S. Brown, Assistant Regional Officer of the Coal Utilization Council, on August 9, showed the newly-acquired premises to Colonel G. S. Wycisk, Vice-Chairman of the Plymouth Joint Service Committee of the Council.

British Welding Research Association

The British Welding Research Association is arranging a number of meetings on increasing productivity by the use of welding to be held at various centres throughout Great Britain. The first meeting is to be held in Glasgow on September 20 and 21, at the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent.

Opening addresses will be given by Mr. F. E. Rogers, Chief of the Productivity and Technical Co-operation Division of the United States Operations Mission to the United Kingdom, and by a representative of the British Productivity Council. Papers will include 'Developments in Welding Steels,' by A. R. Muir, B.SC.; 'Welding Non-Ferrous Resistance Welding,' by P. T. Houldcroft, B.SC.; 'Improving Quality and Reducing Costs by Resistance Welding,' by J. E. Roberts, M.ENG., A.I.M.; 'Developments in Non-destructive Testing,' by H. L. Carson, B.SC., A.INST.P.; 'A New Method of Designing Structures,' by G. M. Moir, B.SC., PH.D.; and 'Reducing the Possibilities of Fatigue, Failure and Brittle Fracture,' by A. A. Wells, B.SC., PH.D. Admission is by ticket (free from the organizer, Glasgow Meeting, Welding Productivity, 8, Northumberland Street, Edinburgh, 3).

INDUSTRIAL GAS MEN AT WATSON HOUSE

At the invitation of North Thames Gas Board, the July meeting of the Industrial Gas Development Committee of the Gas Council was held at Watson House, the Committee being subsequently entertained to lunch by the Board. Mr. F. M. Birks, Deputy Chairman, took the chair at the lunch, and members also made a tour of the industrial laboratory and the industrial workshops and showrooms at Watson House. In the picture on the left members of the Committee are seen watching a demonstration of flame hardening by a Peddinghaus oxy-town gas machine. On the right is a demonstration of Elcontrol automatic ignition and flame protection equipment applied to air blast burners.

TRADE NEWS

Lorry tipping ramp

An aluminium unloading ramp capable of taking a 12-ton tipping lorry up to a height of 4 ft., yet light enough to be man-handled with ease, has recently been constructed at the Bristol works of Frederick Braby & Co., Ltd.

When large quantities of material such as ores or coal are unloaded for storage

Three-part aluminium alloy ramp, enabling lorries to tip from a height of 4 ft., combines portability with high load carrying capacity.

simply by tipping from lorries on to the ground, they occupy far more space than is economical. Unless expensive lifting gear is used, the stockpiles are low and spread over a large area. By backing the unloading tipper up quite a low ramp the height of the heaped material can be doubled. This specially built ramp of light alloy with a three-part construction, consisting of a 4-ft. high trestle supporting two ramps each made up of two extruded aluminium channels 2 ft. apart. Cross-pieces of flat strip, set on edge at 6 in. intervals and braced by ties, form the two wheel-tracks. The trestle is built up of channel and angle sections, with diagonal bracing for additional rigidity. All aluminium alloy extruded sections are in Noral 51SWP alloy, conforming to British Standard Specification 1476/HE1OWP, and are supplied by the Northern Aluminium Co., Ltd. Steel is used for the top member of the trestle (in the form of a pressing from ¼ in. plate), for tubular bearers at the top end of each ramp, and for toe-plates at the lower ends, where lengths of aluminium treadplate form the first 2 ft. 6 in. of track. Cadmium-plated steel bolts are used for fastening throughout, and zinc chromate is applied between aluminium and steel before assembly to prevent any possibility of bimetallic action.

When in use, the ramps are secured to the trestle by 1½ in. diameter steel pegs located in holes in the steel top member of the trestle. Variations in lorry track width are provided for by a range of holes spaced 6 in. apart; overall track width can be varied in this way from 9 ft. to 6 ft., and a length of angle section used to tie the ramps at their lower ends has similar provision for adjustment. For removal to a new position the whole structure can be dismantled in a matter of seconds; the individual ramps are simply lifted from the top of the trestle and lowered on to rubber-tyred aluminium wheels mounted at mid-span and, with the trestle placed on one ramp, both can be wheeled away. Since the overall weight of each ramp is only 6½ cwt., and the trestle is little over 4 cwt., four men can dismantle and erect without difficulty, and two men can move the dismantled parts with ease. For the aluminium sections no painting is required, and maintenance costs for the ramp are therefore likely to be negligible, in spite of the arduous conditions that may be expected.—*Northern Aluminium Co., Ltd., Banbury, Oxon.*

New power pump

A totally enclosed, self-oiling, quadruple-acting power pump has been added to the extensive range of pumps manufactured by Lee, Howl & Co., Ltd. It is made in a number of sizes capable of dealing with quantities from 3,000 to 20,000 gal. per hour, against total heads of up to 300 ft.

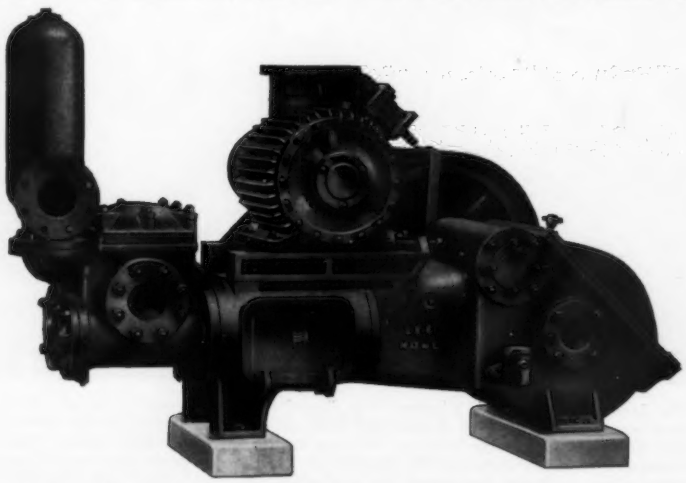
The pump suction can be taken from either side and the large volume delivery air vessel outlet can face any of three directions. The suction valves are situated in the pump body and the delivery valves in a plate bolted between the body and top cover. The valves and buckets are of types to suit the nature of the liquid to be dealt with. The crankshaft is of the three disc type, machined from a mild steel forging and runs on roller bearings, the outer races of which are mounted in recesses provided in the end discs. The inner races are carried on trunnions secured to the crankcase. The machine cut spur gear has a ratio of four to one. The wheel is mounted on the centre disc of the crankshaft and the pinion is forged solid with the countershaft, which runs on roller bearings carried in a housing bolted to the crankcase. The housing on the pulley side is provided with a packing box to prevent oil leakage along the shaft. The crossheads work in bored guides and have extensions into which the bucket rods are screwed. These extensions pass through packing boxes in the end of the distance piece. The connecting rods are of forged steel, with gunmetal marine heads and gunmetal bushes for the crosshead pins in the small ends. The crankcase has a light hinged cover with machined faces, giving access to the crankshaft, etc. The distance piece between the crankcase and the pump is fitted with packing boxes at both ends to prevent leakage from the pump, and oil from the crankcase, those for the bucket rods being of generous depth. On each side, a large hinged cover is provided to give free access to the packing boxes.

The manufacturers say that these pumps have been designed to run for long periods without attention, ease of inspection and removal of internal parts when necessary. They claim that the whole of the moving parts can be removed or assembled in a few minutes, and that, being totally enclosed, the pump is oil and dust tight, so it can be installed in positions where bad conditions prevail. —*Lee, Howl & Co., Ltd., Tipton, Staffs.*

Improved fire fighting

A new 'wet' water composite pressure charge for use in first-aid fire fighting on porous materials such as wool, cotton, upholstery, mattresses, woodshavings, sawdust, rags, straw and hay, has been placed on the market by Nu-Swift, Ltd., fire extinguisher manufacturers.

In fire fighting, it has been found that plain water is handicapped by its surface tension, which may be likened to an invisible elastic skin which tries to keep the area of liquid as small as possible. Surface tension prevents or retards plain water from spreading and penetrating into



Quadruple-acting, self-oiling, totalling enclosed, power pump.

porous materials and therefore hinders the cooling of hot spots which, in the case of dangerous, deep-seated fires, is more important than extinction of surface flames. Otherwise, re-ignition from within may occur.

Wet water has been tested in the United States on fire fighting and the use of wet water on deep-seated fires is said to bring about an increase of 50% compared with the fire fighting efficiency of ordinary water. The Nu-Swift wet water concentrate, which is of the non-ionic type, is held in the composite pressure charge in a plastic bag which is burst instantaneously and automatically when the extinguisher is operated. Claimed to be the first composite wet water pressure charge in the world, the new charge has been approved by the Fire Offices' Committee, but only for use in the Nu-Swift 2 gal. Universal (Royal Navy) Extinguisher, Models 1301 and 1300.—*Nu-Swift, Ltd., Elland, Yorkshire.*

High temperature refractory

The Lafarge Aluminous Cement Co., Ltd., announce that Secar 250 is now commercially available in Great Britain. This is a white calcium aluminate hydraulic cement with an alumina content of 70-75% and with total impurities less than 1%.

Refractory concretes or castable mixes incorporating Secar 250 and a refractory aggregate are claimed to have the normal setting-time and ultra-rapid hardening properties usually associated with Ciment Fondu, but they are also said to have a greatly enhanced refractoriness. For example, concretes made with Secar 250 and corundum aggregate can be put into service at temperatures up to 1,800°C., thus substantially increasing the range of refractory castable construction. Secar 250 may also be used with other refractory aggregates such as crushed firebrick, sillimanite, chrome and chrome-magnesite. It is claimed that all such concretes can be put into service within 24 hours of casting, that they do not shrink and that they have exceptionally high resistance to thermal shock.—*Lafarge Aluminous Cement Co., Ltd., 73, Brook Street, W.1.*

New tube cleaning process

In service still tubes used in the coal tar distillation process tend to become fouled by deposits of bitumen and normally cleaning is a tedious job undertaken with a mechanical drill and scraper. In some cases it may take a full day to clear one tube. A new method of cleaning the inside of tubes is indicated by a report on maintenance work carried out recently at the Prince Regent Tar Co. It was tried out with complete success reducing the cleaning time from one day to 30 minutes. The apparatus was an adaptation of British Oxygen's flame cleaning equipment.

The still tubes in question were cast iron, 15 ft. in length and 2 in. bore, and a simple burner was designed with integral fins, which, besides spacing the burner from the wall of the tube, acted to some extent as scrapers. This fitted into the bore so that the whole length of the tube could be traversed internally.

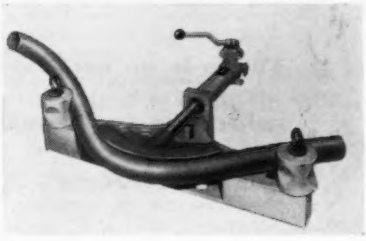
During earlier attempts to burn out the residue, too much heat was applied to the casting, but it was noted that at one stage of the proceedings the gummy bitumen turned into a form of powdery coke, and that this material was easily removed by scraping. In view of this, the burner which was constructed had only a few $\frac{1}{16}$ in. holes drilled into it for gas nozzles, and these were sufficient to bring about the required conditions. The assembly was attached to an ordinary piece of lance tubing through which the gases were supplied, and it was then possible to push the assembly progressively through all the obstructions.

Alternate passes with this burner and a scraper proved adequate to remove all deposits. Although no excess of heat is applied to the pipe being cleaned, the burner itself attains a red heat in a very short time and must, therefore, be constructed in stainless steel. It is also necessary to use a short length of stainless steel tube between the burner and the lance pipe otherwise their life is very short.—*British Oxygen Co., Ltd.*

Tube bending

The manufacturers of the 'Staffa' hydraulic tube bending machines have now extended the scope of one of their machines by providing as accessories, forming dies to bend 2½ in. and 3 in. electrical conduits without undue distortion. They claim that these can be bent cold and unloaded without any preparation. The machine is said to be readily portable and needing no foundation bolts is eminently suitable for site bending. It is claimed to be extremely light to operate and the open type of frame offers many facilities when bending to template or where close bends in two planes are encountered. Unrestricted bending is permissible, combined with maximum speed, as the two-stage action automatically ensures that the ram speed will adjust itself according to the load. Normally with single action pumps the ram speed is constant whether bending ¾ in. or 3 in. pipe with consequent loss in man-hours.

The unit is completely self-contained, developing a bending force of 8 tons and conveniently manipulated on the ground.



Three-in. open-type bending machine.

The frame and general structure are said to be extremely robust so as to stand up to the many site conditions encountered.

The machine can be supplied with seven centre forming dies for bending ¾ in., 1 in., 1¼ in., 1½ in., 2 in., 2½ in., and 3 in. electrical conduits, but with the aid of other attachments it is claimed to be possible to bend various classes of tubes both ferrous and non-ferrous.—*Chamberlain Industries, Ltd., Staffa Works, Staffa Road, London, E.10.*

British Tyre & Rubber Co., Ltd., announce a further extension to the BTR mobile conveyor belt service for the splicing of conveyor belting on site and also for belting repairs. This extension is based with a full complement of operatives and vulcanizing equipment on the company's Burton factory so that coverage for prompt service extends over the whole country. Enquiries should be made to one of the sales branches as follows: *Herga House, Vincent Square, London S.W.1. T/N: Tate Gallery 8361; Broughton Bridge, Blackfriars Road, Manchester, 3. T/N: Blackfriars 7803; 26, Kingston Street, Glasgow, C.5. T/N: South 2782.*

TRADE PUBLICATIONS

Feedwater control

A new catalogue published by James Gordon & Co., Ltd., boiler control specialists, of Dalston Gardens, Stanmore, Middlesex, is entitled *Three Element Feedwater Control.*

Atomic design

The August edition of the *Whessoe Review,* published by Whessoe, Ltd., of Darlington, shows how the reactor shells for the nuclear power station at Calder Hall, Cumberland, have been designed and are being built.

Pitan paints

The latest brochure of Allweather Paints, Ltd., 36, Great Queen Street, London, W.C.2, gives full details of the Pitan chlorinated rubber paint, emulsion paints, enamels, and silicone water repeller. Applications of these products are amply illustrated with some very good photographs.

Pneumatic tools

Full details of a variety of tools for drilling, scaling, scraping, chipping, cutting sheet metal, die grinding, and similar duties, with action photographs of some of these air operated tools in use, are contained in the new catalogue *Pneumatic Tools,* published by B.E.N. Patents, Ltd., High Wycombe, Bucks.

Plastic tubing

A publication by the Yorkshire Copper Works, Ltd., of Leeds, describes the properties, characteristics, and installation of Polyorc A polythene tubes. These tubes are particularly suitable for the chemical and gas industries in conveying most acids, alkalis, and corrosive fluids and gases, in ventilation and fume extraction plants and in pipelines.

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● There is no satisfactory substitute for genuine Chrome steel . . . .

CHROME GASFRETS

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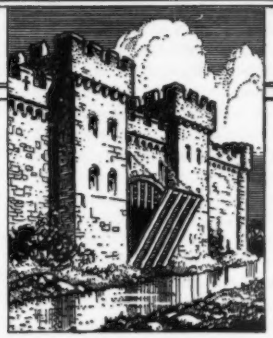
Telephone: Perivale 3238. Telegrams: Gasfret, Greenford, Middlesex.

Agents in Australia:
Mackay Sim Pty. Ltd., 788, Pacific Highway, Gordon, Sydney, N.S.W.



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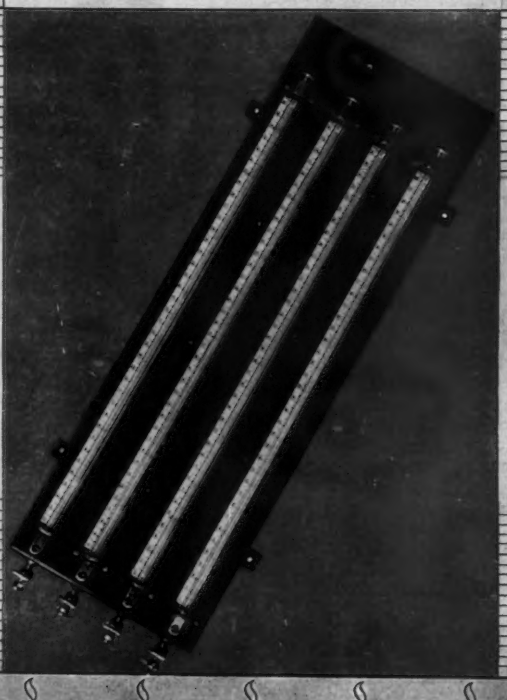

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MILTON HOUSE WORKS
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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/- per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* King's Norton 3868.

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN REPRESENTATIVE: A. Engelhardt, 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

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Telephone: FLEet Street 2236-7. *Telegrams:* Gasking, Fleet, London.

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YES, FACE IT:

FOR 5 MINUTES !

We must fight the Fire Fiend ALONE before the Fire Brigade gets here. Please send details of NU-SWIFT rapid and reliable Fire Extinguishers—BEFORE IT IS TOO LATE !

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Post NOW to Nu-Swift Ltd. 25 Piccadilly W.1.

In Every Ship of the Royal Navy

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RUBBER MOPS

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KETTLE DESCALER

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
SENIOR CHEMIST, CAR HOUSE WORKS

APPLICATIONS are invited from suitably qualified persons for the position of Senior Chemist, Car House Works, Rotherham, at a salary in accordance with grade APT. 9/10 (£700/£860) of the National Salary Scales. The initial placing on the scales will be dependent upon qualifications and experience.

Candidates should have had experience in coal carbonisation and the operation of by-product plant. The person appointed will be responsible under the Works Engineer for the supervision of the laboratory staff and the chemical control of the by-product plant.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications, giving details of age, education, training, qualifications, etc., and giving the names and addresses of two referees, should be addressed to reach the undersigned not later than August 31, 1955.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street,
Sheffield, 1.
August 8, 1955.

EAST MIDLANDS GAS BOARD

SHEFFIELD AND ROTHERHAM DIVISION
APPOINTMENT OF ELECTRICAL FOREMAN FOR CAR HOUSE GAS WORKS, ROTHERHAM

APPLICATIONS are invited for the position of ELECTRICAL FOREMAN at the new Gas Works at present in an advanced stage of construction at Car House, Rotherham.

Applicants should be qualified and preferably have had experience in the operation and maintenance of electrical equipment in gasworks, including turbo alternators and transformers of 1,000 kVA capacity and control gear for motors up to 500 h.p.

They should also be conversant with Electrical Regulations and be capable of controlling electrical maintenance staff.

The salary will be in accordance with A.P.T. 6(a) of the National Salary Scales for Gas Staffs (£590 to £670 per annum).

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications giving details of age, training, qualifications, etc., together with the names and addresses of two referees should be addressed to reach the undersigned not later than August 31, 1955.

C. C. WOOD,
Divisional General Manager.

CCW/EMM/PER.
Gas Offices,
Commercial Street,
Sheffield, 1.
August 5, 1955.

TECHNICAL SALES ENGINEER with general technical education and some plant experience, required by leading Company of Instrument and Automatic Control Manufacturers. Car allowance and expenses paid, contributory pension scheme, etc. To operate in Gas Board areas from Midlands to Scotland and preferably based in Manchester, Leeds or Sheffield areas. Good salary and plenty of scope for initiative. Expenses met for London interview any day. Apply: No. 254, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WALES GAS BOARD

INDUSTRIAL RELATIONS OFFICER

APPLICATIONS are invited for the post of INDUSTRIAL RELATIONS OFFICER.

Candidates will be required to possess wide knowledge of personnel management generally, and in particular, of the principles and methods of determining salaries, wages and conditions of service of employees in a large scale organisation. Applicants should preferably also have had practical experience of staff establishment work and of the conduct of joint negotiations on an Area or National basis. Candidates should also possess experience in the application of education and training schemes.

The commencing salary will be £1,500 per annum. The post is pensionable, and the person appointed will be required to undergo a medical examination.

Applications, stating age, particulars of education, present position, qualifications and experience, with the names of two referees, should be received by the undersigned not later than September 1, 1955.

C. B. MAWER,
Secretary.

Wales Gas Board,
2, Windsor Place,
Cardiff.

EASTERN GAS BOARD

(TOTTENHAM DIVISION)
DEPUTY INDUSTRIAL SALES MANAGER

APPLICATIONS are invited from suitably qualified persons for the appointment of DEPUTY INDUSTRIAL SALES MANAGER.

Applicants should be Corporate Members of the Institution of Gas Engineers or possess other acceptable qualification. They should be used to dealing with all classes of industrialists and capable of assessing and exploiting opportunities for the application of gas to industrial processes, preparing quotations for gas installations and appliances, negotiating and completing sales and supervising installation work.

It is highly desirable that the applicants are experienced in the design of special industrial gas apparatus and central heating installations.

The duties will include, from time to time, the supervision of the technical, clerical and manual staffs.

The commencing salary will not be less than £1,000 per annum.

The successful candidate may be required to pass a medical examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications, stating age, qualifications and experience, should reach the Divisional Personnel Manager, Woodall House, 658, Lordship Lane, Wood Green, N.22, not later than September 16, 1955.

(*Classified advertisements continued on page* 530)

WALTER KING PHOTOGRAPHS

11, BOLT COURT, FLEET STREET, LONDON, E.C.4
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★ PLANT UNDER CONSTRUCTION TAKEN AT REGULAR INTERVALS
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APPOINTMENTS VACANT (*ctd.*)

APPLICATIONS are invited for the position of Gas Engineer for Gas Works in the East.

Applicant must be fully qualified to take charge of works of 4½ million cu.ft. per day capacity, with Horizontal Retort plant.

Age not exceeding 40 years. Salary according to qualifications. Passage paid out and home. First contract five years with provision for home leave.

Apply stating present position, experience, qualifications, age, whether married or single, to No. 253, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

DESIGNER aged 25 to 40 required for work in new and expanding field of dust control. Successful applicant will eventually be responsible for complete design of dust control and ventilation systems and equipment. Applicants should be at least H.N.C. standard and should have served an engineering apprenticeship. Previous experience of this kind of work desirable but not essential. Starting salary according to age and experience. Reply in writing, stating age, qualifications, experience and present salary to W. C. Holmes & Co., Ltd., Huddersfield.

DRAUGHTSMEN.—Applications are invited from Senior and Junior Draughtsmen to fill positions which have resulted from our expanding commitments. The work would involve the design and detailing of welded fabrications, pipework and light steel structures in connection with major installations. Excellent prospects of subsequent promotion exist for persons having initiative and an ability to accept responsibility. Candidates should apply in writing to W. C. Holmes & Co., Ltd., Huddersfield, giving full details of previous experience, etc.

DESIGNER aged 25 to 40 required for work in new and expanding field of dust control. Successful applicant will eventually be responsible for complete design of welded fabrications associated with dust control. Applicants should be at least H.N.C. standard and should have served an engineering apprenticeship. Previous experience of this kind of work in connection with chemical and gas plant and some electrical knowledge desirable. Starting salary according to age and experience. Reply in writing stating age, qualifications, experience and present salary to W. C. Holmes & Co., Ltd., Huddersfield.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
APPOINTMENT OF TECHNICAL ASSISTANT

APPLICATIONS are invited for the above post within the Division. The salary will be within Grades A.P.T. 5-7 (£530-£700) according to experience and ability.

Applicants should have had good all round training and experience in gas manufacture, and for preference should be Associate Members of the Institution of Gas Engineers.

Applications, together with the names of two referees should be received by the undersigned not later than Saturday, September 10, 1955.

CHARLES R. INGHAM,
Production Engineer & Manager.

Radiant House,
Bristol, 1.

SOUTH WESTERN GAS BOARD

BRISTOL/BATH DIVISION
APPOINTMENT OF CHEMIST

APPLICATIONS are invited for the position of CHEMIST at Works within the Division.

Applicants should be familiar with all Gas Works Chemical Tests and Chemical Control of Plant.

Possession of the Higher National Certificate in Chemistry is desirable and the Ordinary National Certificate is a minimum qualification.

The salary will be within Grades A.P.T. 5-7 (£530-£700).

Applications, together with the names of two referees should be received by the undersigned not later than Saturday, September 10, 1955.

CHARLES R. INGHAM,
Production Engineer & Manager.

Radiant House,
Bristol, 1.

NORTH THAMES GAS BOARD

A MECHANICAL ENGINEER is required to work on the personal staff of the Chief Engineer based on Westminster.

Applicants, who should be between 30 and 40 years of age, should possess a degree in Mechanical Engineering or similar qualification and be an Associate of the Institution of Mechanical Engineers and have at least five years' experience in industry. Duties will include development work, particularly in relation to new and improved methods of production, refining and distribution of gas from gaseous and liquid hydrocarbons and coal. Preference will be given to applicants who have practical knowledge of Power Engineering.

Starting salary, according to age and qualifications, would be a minimum of £1,000 p.a.

Applications stating age and giving full details of qualifications and experience should be sent to Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, quoting Reference 666/282.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON AND DISTRICT (NO. 2) DIVISION
TECHNICAL ASSISTANT, SOUTHERN GROUP

CANDIDATES should have practical experience of the control and working of continuous vertical retorts and automatic C.W.G. plants. The successful applicant will normally be employed at the Cradley Heath Works, but may be required to undertake duties at other Works in the Group.

The salary will be within Grade 5 (£530-£610 per annum) of the National Salary Scales for Gas Staffs.

A house adjacent to the Works will be available, at a reasonable rental.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. Stanley Jones, Divisional General Manager, West Midlands Gas Board, Wolverhampton and District Division, Kensington House, Bath Street, Dudley, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION
DIVISIONAL TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited for the above post in the Divisional Distribution Engineer's office at Gas Street, Coventry.

Candidates should have considerable experience of modern gas distribution technique, including integration and planning, together with practical experience of main and service laying involving direct and contract labour. Candidates preferably should be Corporate Members of the Institution of Gas Engineers, or possess an equivalent technical qualification.

The salary will be within Grade 9 (£700-£800 per annum) of the National Salary Scales for Gas Staffs.

A flat will become available at a reasonable rental.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and particulars of training and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Warwickshire Division, Gas Street, Coventry, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

ENGINEERING ASSISTANT—INDUSTRIAL DEPARTMENT

APPLICATIONS are invited for the position of ENGINEERING ASSISTANT on the staff of the Industrial Gas Officer, Industrial Department, Brasshouse Passage, Broad Street, Birmingham.

Candidates should preferably hold a degree in Science (Engineering) or the Higher National Certificate in Mechanical Engineering.

Experience in the design of gas or other fuel fired furnaces would be an advantage.

The salary for the post is within Grade II (£785-£910 per annum) of the National Salary Scales.

The appointment is superannuable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham 15.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

DRAUGHTSMAN—INDUSTRIAL DEPARTMENT

APPLICATIONS are invited for the position of DRAUGHTSMAN in the Drawing Office, Industrial Department, Brasshouse Passage, Broad Street, Birmingham.

Candidates should possess, as a minimum qualification, the Ordinary National Certificate in Mechanical Engineering, and have at least three years' Drawing Office experience, preferably on Furnaces, Ovens or similar work.

The salary for the post is within Grade 7 (£620-£700 per annum) of the National Salary Scales.

The appointment is superannuable, and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham 15.

J. C. INGRAM,
Secretary to the Board.

PLANT FOR SALE

FOR SALE: NEW GAS-FIRED BOILER by Hartley & Sugden. 160 lbs./hour at 80 lbs. p.s.i., complete with chimney, spare burner and controls. Original purchase price was £419. Our price £200. W. H. COLLINGBOURNE & CO., LTD., 1481, Stratford Road, Birmingham, 28. Phone: Shirley 3303.

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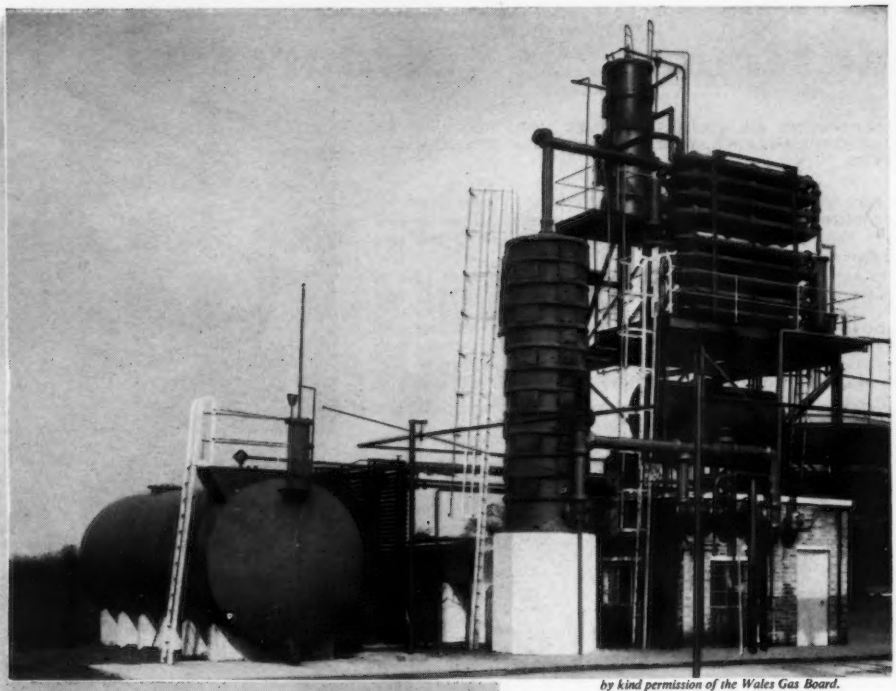
Blue pressed and Wirecut Paviors for Hopper Linings and Retort House Floors

COMPRESSORS & EXHAUSTERS FOR AIR AND GAS.
See our Advertisement Next Week.
REAVELL & CO. LTD. IPSWICH.



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Liquor Concentration Plant

A recent Liquor Concentration Plant Installation designed to treat 20,000 gallons of crude liquor per day.
Heat Exchange between raw and stripped liquors is installed with final cooling of the stripped liquor.

W. C. HOLMES & CO. LTD

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industrial gas compressors

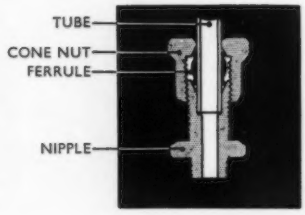
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see illustration right) are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".
CAPACITY RANGE: 100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.

TYPE 4 COMPRESSORS (not illustrated) are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.
CAPACITY RANGE: 500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.
AREA OCCUPIED: from 9¼" x 16½" to 61" x 27".

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.



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serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies. **Size Range:** 1", 1¼", 1½", 2" and 2½" outlets. **Capacity Range:** 45-280 cub. ft. of gas per hour.

Brass non-blow-off head types: deal with 5 to 10 cub. ft. of gas per hour.

Stainless steel, "F" type head, burner: deals with 8 cub. ft. of gas per hour.

Perforated head type burner: deals with 10 to 15 cub. ft. of gas per hour.

INDUSTRIAL GAS EQUIPMENT

524

Railway Sidings Construction

Design, Installation and Maintenance

The Grant Lyon Railway Sidings installation for the new 60-ton Electric Melting Furnace Project at the Stocksbridge Works of Messrs. Samuel Fox & Co. Ltd. included: lifting 3½ miles of track from old sidings; filling up and making new foundations to a maximum depth of 12 ft. using 15,000 tons of slag; laying temporary track; laying approximately 5¼ miles of permanent track involving 39 leads, 5 tandems, 1 diamond, 5 single slips and 1 double slip.

Enquiries are invited for the design, installation and maintenance of railway sidings.

GRANT LYON
AND COMPANY LIMITED
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Railway and Civil Engineering Contractors
HEAD OFFICE: Scotter Road, Scunthorpe, Lincs.
Phones: Scunthorpe 2308/9; Manchester DEAnsgate 7805; Swansea 2519.

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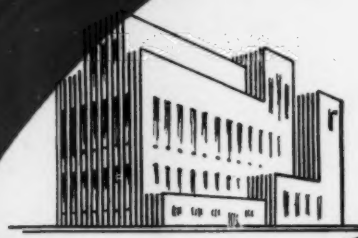
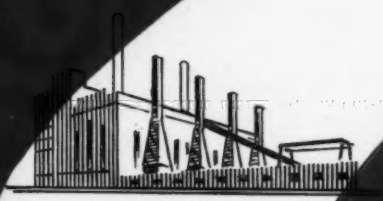
Two sides to the question . .



CONTINUOUS

OR INTERMITTENT



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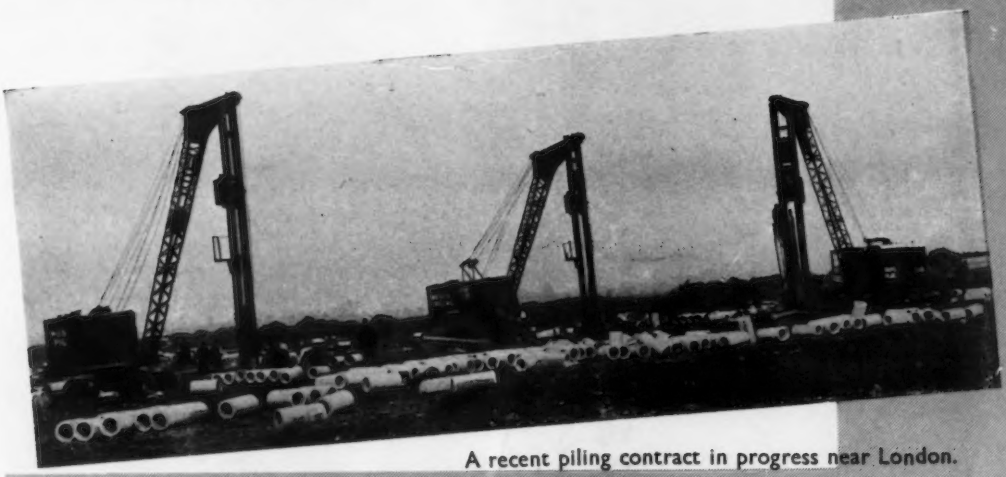
GC3

Piling



A recent piling contract in progress near London.

and

Construction

56,000 gal. reinforced concrete water tower constructed at Reading Gasworks.

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